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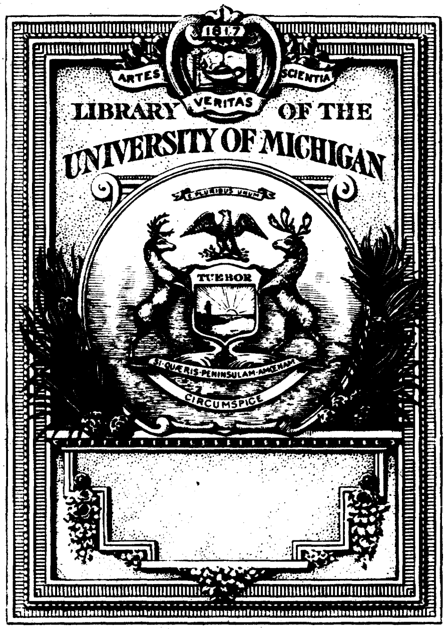
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THIRD ANNUAL REPORT

OF THE

PHILIPPINE COMMISSION.

117510

1902.

PART 1.

BUREAU OF INSULAR AFFAIRS,
War Department.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1903.

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To the Senate and House of Representatives:

I herewith send a letter from the Secretary of War transmitting the third annual report of the Philippine Commission covering the year ending October 1, 1902, and the laws passed by the Commission between July 1, 1902, and October 27, 1902.

I call your special attention to the recommendations contained in this letter of the Secretary of War. I most earnestly feel that the enactment of the measures already pending in your body for the betterment of the Philippine Islands is imperatively demanded by the situation in those islands and serious calamity may come from failure to enact them. Furthermore, I with equal earnestness ask your attention to the recommendation of the Secretary of War in the accompanying letter and urge its adoption so that the sum of money therein specified may be appropriated for the uses and in the manner likewise specified in order that the present distress in the islands may be remedied.

THEODORE ROOSEVELT.

WHITE HOUSE, *January 7, 1903.*

WAR DEPARTMENT,
Washington, January 6, 1903.

The PRESIDENT:

I have the honor to transmit herewith the third annual report of the Philippine Commission, covering the year ending October 1, 1902. This report is in compliance with the third paragraph of the Instructions to the Philippine Commission, dated April 7, 1900, and with section 86 of the act entitled "An act temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes," approved July 1, 1902.

Accompanying the report, and transmitted with it, are the acts of the Philippine Commission, from and including act No. 425, enacted July 2, 1902, to and including act No. 493, enacted October 27, 1902.

Section 86 of the act of Congress above cited requires that these laws shall be reported to Congress. All of the laws enacted by the Commission prior to that act have already been reported to Congress.

I beg to ask special consideration of the recommendations of the Commission, all of which have my hearty approval.

It seems to me that the conditions resulting from the destruction by rinderpest of 90 per cent of the carabaos, the draft animals of the islands, and the consequent failure of the rice crop, followed by an epidemic of cholera, are so serious and distressing as to call for action by Congress beyond that for which the Commission specifically ask.

The removal under the laws of Congress of export duties on goods shipped from the Philippines to the United States has materially reduced the revenues of the island, while the duties collected in the United States upon importations from the Philippines, which under the same laws were to be turned over to the Philippine treasury and were expected to make good the deficit, have amounted to practically nothing. At the same time the decline in the price of silver, the evils of a fluctuating currency, and the impoverishment of the people, have reduced the government revenues when they are most needed for relief of the people.

I think the occasion for relief in the Philippines is now greater than it was in Cuba when Congress appropriated $3,000,000 for the payment of the Cuban soldiers out of the Treasury of the United States, or than it was in Porto Rico when hundreds of thousands of dollars were contributed by the people of the United States, and more than a million of dollars paid out of the National Treasury for the relief of the sufferers from the hurricane of August, 1899.

An appropriation of not less than $3,000,000 for the relief of the distress in the Philippine Islands from the causes which I have mentioned would be in harmony with the course pursued by Congress toward the people of the other Spanish islands and practical evidence of the sincere interest that the people of the United States take in the welfare of the Philippine people and of the kindly and generous treatment which they are to receive. Previous experience indicates that such an appropriation could be made the most useful by giving the Philippine government discretion to apply it, in such proportions as they deem wise, in the direct purchase and distribution or sale of supplies, or through the employment of labor in the construction of government wagon roads, railroads, or other public works.

Very respectfully,

ELIHU ROOT,
Secretary of War.

REPORT OF THE UNITED STATES PHILIPPINE COMMISSION.

REPORT

OF THE

UNITED STATES PHILIPPINE COMMISSION.

Philippine Commission,
Manila, November 1, 1902.

Sir: The Philippine Commission begs to submit this, its third annual report, for the year ending October 1, 1902. In previous reports the Commission has dealt with every phase of the conditions existing in the islands, and the steps taken by it or members of the Government for their improvement. On the 1st of September, 1901, the civil government became definitely established, with a civil governor and four departments, at the head of each of which was a secretary. It has seemed best to the Commission, in view of this organization, that the governor and the four secretaries should each make a report to the Commission concerning the transactions under the immediate executive control of each, the governor giving an account of the general conditions prevailing in the islands and of the work done by the bureaus reporting directly to him, and each of the secretaries giving an account of the work done by the bureaus included in his department. It has been thought wise for the Commission not to deal at length with the details of the transactions of the government during the past year, but only to refer to the general conditions and to certain subjects, the pressing importance of which may reasonably demand the attention of Congress at this session.

The insurrection as an organized attempt to subvert the authority of the United States in these islands is entirely at an end, and the whole Christian Filipino population, with the exception of a few thousand of persons who have settled in the Moro country in isolated towns, are enjoying civil government under the beneficent provisions of recent Congressional legislation concerning the Philippines. Much remains to be done in perfecting the civil government, in marshalling the forces of law and order against lawlessness and disturbances, and in teaching the people of the Philippine Islands not only that they have rights under the law, but also that they can not hope to enjoy such rights unless they acquire courage and independence sufficient to assert them against attempts by their fellow Filipinos to perpetuate the system of "caciqueism," or, liberally translated, "bossism," by which they have heretofore been completely governed, and under which they have enjoyed very little of personal liberty.

Comparatively few of the Filipinos who have been heretofore interested in politics as insurrectos or otherwise have felt an interest in teaching the common people their individual rights in respect to personal liberty, property, or the pursuit of happiness. This work of instruction in individual rights will require many years before the country is rid of the feudal relation of dependence which so many of the common people now feel toward their wealthy or educated native leaders and of the ideas underlying this relation. It is in the existence of this relation that much of the difficulty in the labor problem in these islands finds its source. The laborers under the Spanish régime were accustomed to do their work at the bidding of some superior, not from a motive of earning wages, but in obedience to the order of one entitled to command; and there rests upon this government and upon the American Government the duty of teaching the Filipino laborers the independence and dignity of labor under a free government, before they may do their best work and contribute as much as they should contribute to the development of their country. The organization of labor into unions in Manila, while brought about by a crack-brained insurrecto agitator for political purposes only, will, we hope, lead to an organization that may have much to do with inculcating this lesson.

No great work of organizing a government and establishing new conditions has ever met with more obstacles than the one upon which the Philippine government is at present engaged. The six years of war to which these islands have been subjected have naturally created a class of restless men utterly lacking in habits of industry, taught to live and prey upon the country for their support by the confiscation of food and supplies as a war measure, and regarding the duties of a laborer as dull and impossible for one who has tasted the excitement of a guerrilla life. Even to the man anxious to return to agricultural pursuit the conditions existing present no temptation. By the war and by the rinderpest, chiefly the latter, the carabaos, or water buffaloes, have been reduced to 10 per cent of their former number. The chief food of the common people of these islands is rice, and the carabao is the indispensable instrument of the people in the cultivation of rice as they cultivate it, as it is also the chief means of transportation of the tobacco, hemp, and other crops. The loss of the carabaos has reduced the production of rice in the islands 75 per cent, and the 25 per cent remaining is in imminent danger from the locusts which, very destructive in the Visayan Islands last year, are this year sweeping over the rice fields of Luzon and threaten to destroy utterly the crops of those provinces of Luzon which may fairly be considered the granery of the Philippine Islands.

So short is the rice crop and so high has the price of rice become, estimated in the Mexican dollar—due both to the scarcity of rice and the fall of silver—that the Commission has deemed it necessary within the last few days to take the steps of purchasing 300,000 piculs (137½ pounds to the picul) of rice, to be sold at cost in provinces where the price of rice furnished through the ordinary commercial channels shall be exorbitant. The price of carabaos has risen from $20 Mexican to $200 Mexican apiece. The cholera, beginning in Manila in March of this year, has raged in the various provinces and has not yet disappeared. Vigorous measures were adopted to reduce its spread in the city of Manila and elsewhere, but it will probably claim in the archipelago 100,000 victims. It has greatly interfered with agriculture, and the sanitary restrictions, which were enforced with greater or less rigor throughout the islands have incommoded a people who do not sympathize with or understand their necessity. The suspicious timidity and superstition of these people were aroused by the ravages of cholera to the point of attributing the disease to poisonous powders dropped into wells by American soldiers for the purpose of destroying the entire populace, and the quarantine regulations were regarded by the more ignorant as a manifestation of hostility to the people by the American Government.

The Filipino people of the better class have received the passage of the Philippine act with great satisfaction. The provision for the legislative assembly has attracted much attention, and its passage has been interpreted as an earnest of the desire of the United States Government to test the governing capacity of the people and of the sincerity of its promises to extend to them self-government as rapidly as they shall show themselves fit for it. The extremists, of course, desire two popular legislative bodies instead of one, and others not so extreme are anxious that the legislative assembly shall be established immediately after the taking and publication of the census instead of two years thereafter. The Commission feels that it will be in a much better position to make recommendations upon the point of expediting the holding of the assembly after the census has been taken. The coming year, under the trying circumstances which now prevail, will show how much we may depend upon the conservative and law-abiding character of the controlling elements of the Filipino people.

The fluctuations in the value in gold of the Mexican dollar have borne heavily on the common people. Wages are in silver and they have not advanced with the cost of living, for the merchants and tradesmen much more readily make their prices respond to the fluctuations in the value of the Mexican dollar than do those dependent on wages and salaries for a living. The fluctuations in the value of silver have greatly interfered with business. The evils attendant on such fluctuations are fully set forth in the report of the secretary of finance and justice. We urge with as much earnestness as possible the necessity for immediate action by Congress in establishing a gold standard, and we recommend the adoption of the plan which was recommended by the Commission in its last year's report. The theory that the only persons prejudiced by the fluctuations in silver values are the civil servants of the insular government is wholly unfounded. Their convenience is somewhat affected it is true, but the present system, by which the official rate is changed to meet the commercial rate every ten days, much reduces their losses from the fluctuation, and if the only inconvenience caused by the fall in silver was to them, we should not feel called upon in this report to recommend a change. It is the inconvenience and suffering and injustice done to the common people and to the merchants and to the conduct of business on safe principles that require us to speak with as much emphasis as we can command.

The business of those islands is much more affected by exchange on London and New York than by that on Hongkong, Singapore, and Shanghai. The importations are largely from Europe and America. The merchants of Manila are not alone in their complaints against the effect of the silver standard on business. Their brethern of Singapore and Hongkong and of all the ports of China complain bitterly of the impossibility of carrying on business on wise and conservative lines as long as the prices of articles are to be subjected to such violent fluctuations as have affected the value of Mexican dollars in the last year, and seek to avoid loss as much as possible by making contracts and doing business on a gold basis. The insular government of the Philippine Islands has itself lost $950,000 in gold value during the last year from the fall of silver, changing the expected surplus into a deficit.

First. We respectfully urge that it is the duty of the American Government to secure to the Philippine people as stable a currency as that which is used by the people of the United States; and we are confident that this can be accomplished with a minimum of risk to the Treasury of the United States and the treasury of the Philippine Islands if the plan already recommended be adopted. A banking law with power to authorize the issue of paper currency on good security is very badly needed and should be included in any plan for relief of the monetary situation.

Second. We urge the reduction of the duties imposed on goods and merchandise imported into the United States from the Philippine Islands so as to make them not more than 25 per cent of the duties imposed by the Dingley law. The reduction of only 25 per cent, and the absurdly small effect of that reduction upon the trade between the islands and the United States, shown in the collection of little more than $11,000 of duties in five months, demonstrates that if any benefit at all is to be conferred upon the Philippine Islands by such action, the percentage of reduction must be largely increased. We feel confident that a reduction of 75 per cent will not result in a dumping upon the American market of either tobacco or other commodities so as perceptibly to affect that market; while, on the other hand, the ability to sell in the markets of the United States will be of the greatest encouragement to the woefully depressed agriculture of the Philippine Islands, under the conditions which we have described. The reduction of 25 per cent, instead of being an aid to us in winning the good will of the Philippine people, if it is not followed now by further reductions, will lead them to believe that we are merely going through the form of a concession, which amounts in fact to no concession at all; that the United States is merely "keeping the word of promise to the ear and breaking it to the hope."

We think that a 50 per cent reduction will not give any substantial relief, and that nothing short of 75 per cent will accomplish a useful purpose. It is a mistake to suppose that the severance of these islands from Spain has made no difference in the markets to which their tobacco and sugar growers may look. On the contrary, with the separation from Spain, the sugar and tobacco growers have been deprived of markets which were of great assistance to them, and it seems only fair and just that the United States should substitute its own markets for the Spanish markets.

Third. Another matter which we desire to call to your attention, and through you, if it meets with your approval, to that of Congress, is the burdensome restrictions upon the investment of capital in lands and in mines in these islands. As the Government owns 65,000,000 of acres out of 70,000,000 in the archipelago, there is substantially no danger that the ownership of land here can be centered in a few individuals or corporations if the amount owned by any one individual owner or corporation is limited by law to 20,000 or 25,000 acres. The government of the islands is land poor, and the sale of land to individuals and corporations who will come in and invest their money in improving it is the greatest boon that could happen, not only to the Government, but to the people themselves. The requirements that no corporation shall own more than 2,500 acres stops absolutely the investment of new capital in the sugar industry and in the tobacco industry. It takes away any hope of bringing prosperity to these islands by the extending of the acreage in the cultivation of these two important products of the archipelago. It very much interferes with the investment of capital in railroad enterprises, because they are naturally connected with the possibilities of transportation of sugar and tobacco from the interior to seaports. It is not too much to say that there will be found in the long run to be no greater obstacle to the permanent improvement of economic conditions here than the present restrictions upon the amount of land that can be held by a corporation or individual. If an absolute sale of such large amounts to one corporation as 25,000 acres is objected to, then it would greatly aid in securing the investment of capital if leases of 30,000 acres for fifty, sixty, or seventy years could be granted to a corporation or individual.

There are also strong reasons for urging that the requirement that no person shall own an interest in two mining claims should be repealed. It will paralyze all enterprise and take away from prospecting capitalists all interest in the mineral wealth to be found here, unless some method of evading the restriction can be devised. The demoralizing effect upon a whole community of the nonenforcement or evasion of unwise laws need not be dwelt upon.

Fourth. We desire to urge that all the bonds authorized to be issued by the Philippine government, for internal improvements or otherwise, shall be made free from State, county, and municipal taxes in the United States. The government which is being carried on here is an experiment by the United States in a new field, and taxes upon the bonds which are issued to carry on the work of improvement here are an interference with this work and with an important agency of the United States. Congress has not deemed it proper to guarantee the payment of the bonds, which would have much reduced the interest to be paid on them, but if it will give to the bonds the exemption from taxation above mentioned, the insular government will be able to float them at a reasonable rate. This exemption has been provided for the bonds to be issued in the purchase of the friars' lands; and we can not see why any distinction should be made between those bonds and bonds issued by the Philippine government for other reforms and improvements in the islands.

It will be found, should we be obliged to issue bonds subject to State, county, and municipal taxes, that not one dollar of value will probably be added to the personal property actually taxed in any State by reason of declared ownership of such bonds; and therefore by giving such exemption as we ask not one dollar will be withdrawn from the taxable property in a State, county, or municipality in the United States. With such exemption, however, administrators, trustees, and public corporations like banks, trust companies, and loan companies, whose investments are continually subject to the examination of the public assessor, will be able to invest and hold the bonds free of taxation, and will make a market for them which will insure their sale at a reasonably low rate of interest.

The questions growing out of the friars' lands, and of the former relations of the Roman Catholic Church to the government of these islands under the Spanish régime, which were made the subject of negotiation on the visit of the civil governor to Rome between him and the head of the Catholic Church, having been referred for further discussion and possible solution to conferences between the apostolic delegate of the Pope and the civil governor in Manila, are to be taken up during the coming winter. The civil governor has been advised by a letter from Archbishop Giambattista Guidi of his appointment as apostolic delegate and of his intention to visit the Philippine Islands. He will arrive in Manila about the 20th of November, and soon after that date the negotiations will be begun.

The Commission does not concur in the view that it would be wise to admit Chinese unskilled labor into these islands. The objections to such a policy are sufficiently set forth in the report of the civil governor to the Commission, and do not require further elaboration. The Commission does not concur in the view that there will not be a good supply of labor from the Filipino people. It believes that as conditions become more settled, as the Filipino labor is better organized, as the Filipino people are taught the independence and dignity of labor, the supply and efficiency of the Filipino laborers will become much more satisfactory than they are to-day. The Commission is of opinion, however, that there are not sufficient skilled laborers among the Filipinos to meet the emergencies in the constructions immediately necessary for the development of the islands. It believes that shipyards and other industrial enterprises would be established here were there a supply of skilled labor. Even if it were more expensive than the labor of the United States, these islands might successfully supply domestic needs in shipbuilding. This relief thus recommended need only be temporary. The introduction of a limited number fixed by Congress of skilled laborers, under bond by their future employers that they should be returned to China in five years, and that while here a Filipino apprentice should be employed for every Chinaman admitted and employed, would secure after five years a sufficient number of skilled laborers among the Filipinos not to require further Chinese assistance. We think that the details of such restrictions might safely be left to the Commission, and that the Commission might be authorized to impose a small head tax, not exceeding $50, on each Chinaman so admitted, to reimburse the government for the expenses of supervision and enforcement of the restrictions.

We respectfully urge, therefore:

1. The establishment of a gold standard in these islands upon the plan recommended by the Commission in its report of last year, and of banking corporation empowered to issue circulating bank notes under proper safeguards.

2. The reduction of at least 75 per cent of the Dingley rates of duties upon goods imported into the United States from the Philippine Islands.

3. An amendment of the Philippine act so that the limit upon lands which may be sold to or held by individuals or corporations from the public domain shall be increased from 1,024 hectares to 25,000 acres or, in the alternative, so that the government shall be given the power

to lease for sixty years upon competitive bidding tracts from the public land aggregating in any individual or corporate lessee not more than 30,000 acres.

4. That the Philippine act be amended by repealing the limitation which forbids an individual or corporation from holding an interest in more than one mining claim.

5. That all bonds issued by the insular government under the authority of the Philippine act shall be free from State, county, and municipal taxation in the United States.

6. That an amendment be made to the Chinese-exclusion act giving power to the Government by law to admit a fixed and limited number of Chinamen into the Philippine Islands, who are certified to be skilled laborers, on the bond of the employer that for every Chinese skilled laborer employed he will employ a Filipino apprentice, and that he will return the Chinese skilled laborer thus introduced within five years after his admission to the country, and that he shall pay a head tax of not exceeding $50 for each Chinaman so admitted, to the insular government, to meet the expenses incident to the enforcement of these restrictions.

We beg to submit herewith the reports of the civil governor and of the heads of the four departments, together with the laws of the Commission passed since its last report, for transmission to Congress in accordance with law.

Very respectfully,

WM. H. TAFT, *Chairman.*
DEAN C. WORCESTER.
HENRY C. IDE,
Per W. H. T.
BERNARD MOSES.
T. H. PARDO DE TAVERA.
B. LEGARDA.

The SECRETARY OF WAR,
Washington, D. C.

NOTE.—Commissioners Luke E. Wright and José R. de Luzuriago, being absent from Manila, do not join in this report.

REPORT OF THE CIVIL GOVERNOR.

REPORT

OF

THE CIVIL GOVERNOR.

MANILA, *November 1, 1902.*

GENTLEMEN: I have the honor to submit a report to you on the general conditions in the islands and in respect to the bureaus which by law are under my direct supervision, as well as those which are in the department of commerce and police, and which, in the absence on leave of Vice-Governor Wright, the secretary of commerce and police, are temporarily also under my supervision. The report of the Commission of last year upon the subjects treated in this report covered a period ending the 15th of October, 1901, and this report will, unless otherwise specified, cover the year ending the 1st of October, 1902.

GENERAL CONDITIONS.

When our last report was submitted there was insurrection in the province of Batangas, where the insurgent forces were commanded by General Malvar, and in the adjacent provinces of Tayabas and Laguna; in the province of Samar, where the insurgent forces were commanded by General Lukban; in Cebu, where the insurgent forces were under the insurgent leaders Climaco and Maxilom; in Bohol, where the insurgent forces were commanded by the insurgent leader Samson; and in the island of Mindoro. Vigorous campaigns were begun in November and December by General Bell, in Batangas, Laguna, Tayabas, and Mindoro, by General Smith in Samar, and by General Hughes in Cebu and Bohol. In November and December the insurgents in Cebu and Bohol surrendered, and conditions of peace were so completely established that the Commission soon after received the province of Cebu from the military authorities, and by act numbered 322, passed December 20, 1901, restored the civil government in that province to take effect January 1, 1902; in Bohol the province was delivered over to the Commission early in 1902, and the Commission, by act of March 3, 1902, restored civil government there to take effect April 1, 1902. General Lukban, in Samar, was captured in February, 1902, and the entire force of insurgents in that island under General Guevara surrendered in April following.

By an act passed June 17, 1902, No. 419, the Commission organized the province of Samar, and established civil government there. In April of 1902, General Malvar surrendered with all his forces in Batangas, and by act passed June 23, 1902, the Commission restored civil government to that province to take effect July 4, 1902. By act No. 424, enacted July 1, 1902, the province of Laguna was organized into a civil government. This completed the organization of all the provinces in which insurrection had been rife during the latter part of 1901, except Mindoro. There were, in addition, certain tracts of territory occupied by Christian Filipinos that had not received civil government, either because of the remoteness of the territory or the scarcity of population. By act No. 337 the province of Nueva Viscaya was, on January 28, 1902, given a civil government. This province is situated in the northern center of Luzon, at the headwaters of the Cagayan River. It is quite mountainous, has about 60,000 non-Christian inhabitants and about 16,000 Christian Filipinos. It has a delightful climate, and in the valleys there is great richness. The fruits and vegetables of the temperate zone grow quite luxuriantly there.

On May 28, 1902, the Commission organized the province of Lepanto-Bontoc, also a mountainous province in the north-central part of Luzon occupied wholly by Igorrotes, and for which the same kind of a government as that of the province of Benguet was established by act No. 410. The districts of Infanta and Principe and the island of Polillo are on the east coast of Luzon, with very few towns, very sparsely settled, and at remote distances from Manila. It seemed wisest to include them in the province of Tayabas, which reaches from the China Sea on one side across to the Pacific on the other, and which has the towns of Mauban and Antimonan on the Pacific coast. These are the towns which the people of Infanta and Principe and Polillo look to as their bases of supplies when they buy anything, and as the places where they sell what they have to sell. By act No. 417, therefore, passed June 12, 1902, these three districts were included in the province of Tayabas.

The province of Paragua, including the north half of the island of Paragua and the Cuyos and Calamianes groups of small islands to the eastward, were embraced in a province known as the province of Paragua by an act passed June 23, 1902, numbered 422. The island of Mindoro, in which early in the year all the insurgents had been captured or had surrendered, was by act of June 23, 1902, act No. 423, incorporated with the island of Marinduque in the province of the latter name. In this way all the territory occupied by the Christian Filipinos, except a small district of Dapitan, the town of Zamboanga, the town of Cottabato, and the town of Davao, all in the island of Mindanao, was brought under civil government. In respect to the last-named district and isolated towns, which are so widely separated, and which have so small a population as to make their organization into a province under the provincial law impossible, the Commission has taken no definite steps except to organize the Filipinos of Zamboanga into a municipal corporation under the municipal code. They are generally under the control of the military commander of the Seventh Separate Brigade, which includes Mindanao, and can only be provided for in a comprehensive law for a civil or civil-military government of Mindanao.

The question what shall be done with respect to Mindanao is one which has not been definitely decided, first, because so much has had to be done with respect to the northern and Filipino provinces, and, second, because at present there is an unsettled condition in the Lake Lanao country. The hostility to the Americans does not reach beyond the Lake Lanao Moros. The Moros of the Jolo group, of Zamboanga, and of the Rio Grande de Mindanao Valley are all quiet, and all entirely willing to submit to American supervision. It is very possible that an arrangement can be brought about by which the Sultan of Jolo can be induced to part with such rights as he claims to have in the Jolo Archipelago, and that in this way questions which now present very perplexing difficulties with respect to ownership of privileges, rights, and lands may be obviated. The reports of General Davis, which are included in General Chaffee's annual report, are full of most interesting information, and must be carefully considered before a permanent arrangement shall be made for the administration of that part of the Philippine Archipelago. Meantime, I think it is wiser on the part of the Commission to postpone the consideration of the Moro question until we have passed legislation to meet needs that are more pressing throughout the northern part of these possessions of the United States. For a great many years to come there will be no question of popular government in the Moro country; the Moros do not understand popular government, do not desire it, and are entirely content with the control by their dattos. Possibly far in the future the control by dattos will cease. There is room for material and industrial development among the Moros, and with their material improvement may come a change in their political views. For the present, however, it is necessary only to provide a paternal, strong, but sympathetic government for these followers of Mohammed.

GENERAL CONDITIONS OF THE FILIPINO PROVINCES.

The civil government has assumed responsibility for the preservation of order and the maintenance of law throughout the Christian Filipino territory of this archipelago at a time when the material conditions are most discouraging and present every conceivable obstacle to the successful administration of the affairs of 6,000,000 or 7,000,000 people. The war of six years since 1896 has greatly interfered with the regular pursuit of agriculture, which is almost the only source of wealth in the islands. Many years ago there was sufficient rice raised in the islands not only to feed the people but to export it to other countries. For a number of years before the American occupancy rice had been imported. The area of cultivation of the rice has been much lessened during the war and many fields which were formerly tilled are grown now with the cogon grass because of neglect.

The greatest blow to agriculture has been the loss of the carabao or water buffalo, upon which the cultivation of rice, according to the mode pursued in these islands, is wholly dependent. The war in some degree, and the rinderpest in a much larger degree, have destroyed about 90 per cent of the carabaos; and the natives—never very active in helping themselves—have simply neglected the rice culture, so that now these islands are compelled to spend about $15,000,000 gold to buy food upon which to live. The carabao is not so necessary in the cultivation of the sugar crop or in the cultivation of hemp. With respect to those two crops it is used chiefly for transportation, but in the case of the rice the cultivation is wholly dependent upon it. The rice crop in China and Saigon has suffered from the drought, and the price of rice is higher than usual throughout the Orient. In the Philippines it has risen from $4 per picul of 137½ pounds to $7 a picul, which is the present market price expressed in Mexican dollars. Part of this is due, of course, to the depreciation in silver, but the effect upon the natives, who have only silver, is just as disastrous as if it were due to some other cause. In addition to the loss of the carabaos, which has reduced the acreage of rice by 75 per cent below the normal, the locusts for the last two years have been very destructive upon the short crops which are raised. The native ponies which, while not strong enough to supply the place of the carabaos in plowing, are much used by the natives for transportation, have suffered severely both from the war and from the glanders and a disease which in India is called the "surra."

The cholera has swept over these islands with fatal effect, so that the total loss will probably reach 100,000 deaths. Whole villages have been depopulated and the necessary sanitary restrictions to avoid its spread have interfered with agriculture, with intercommunication, and with all business. The ravages of war have left many destitute, and a guerrilla life has taken away from many all habits of industry. With no means of carrying on agriculture, which is the only occupation of these islands, the temptation to the less responsible of the former insurgents after surrender to prey upon their neighbors and live by robbery and rapine has been very great. The bane of Philippine civilization in the past was ladrones, and the present conditions are most favorable for its growth and maintenance. Ladronism was in the Spanish days more prevalent in the Tagalog provinces of Bulacan, Nueva Ecija, Zambales, Rizal, or old Manila, Cavite, Batangas, Tayabas, and Mindoro, than in any other part of the archipelago. Cavite was famous as "the mother of ladrones." Many who were proscribed for political offenses in the Spanish times had no refuge but the mountains, and being in the mountains conducted a free robber life, and about them gathered legions not unlike those of the Robin Hood days of England, so that they attracted frequently the sympathy of the common people. In the Spanish days it was common for the large estate owners, including the friars, to pay tribute to neighboring ladrones. Every Tagalog province had its band of ladrones, and frequently each town had its recognized ladrone whom it protected and through whom it negotiated for immunity.

The high price of carabaos and of ponies produced by the scarcity has made ladronism a lucrative business. Both the ponies and the carabaos bear the indicia of ownership in the brands which are burned into their skins. The ladrones are exceedingly skillful in changing and altering the brands and even in changing the form of the horns of the carabaos, so that they are able to steal carabaos in Batangas, run them over into Cavite, change their marks and appearance, and then sell them in Manila without any great fear of detection or identification.

The warfare in Batangas was so thorough in its methods that the ladrones of that province were exterminated. In the province of Laguna the ladrones were driven out both by the Americans and the insurgents, General Cailles, of the insurgent army, executing many of them by military order; but Cavite has never been rid of them. In that province the ladrone leaders were given commissions in the insurgent army, and when the insurgents surrendered, they returned to their former profession. The same thing is true of Bulacan and of the mountainous district of Zambales. Ladronism has also been always found in the mountainous districts of the province of Rizal and in the towns of Caloocan and Malabon, a few miles north of Manila. Through these towns the ladrones have been in the habit of coming into the city of Manila whenever pursuit was hot and of remaining in concealment until the danger had passed. It is not certain whether in the present depressed state of agriculture, with the temptations to ladronism, that the constabulary will be able without the aid of the military to stamp it out. Were there any attractions to agriculture, were there prosperous conditions in the country, it would not be a troublesome matter to deal with; but when want and famine are staring people in the face the life of the freebooter offers to the desperate and the weak a very great attraction.

The natural discontent with the government when suffering is at hand, promoted as it has been by the cholera restrictions and the high prices of rice and other commodities which have been greatly enhanced by the depreciation of silver, might well have caused a new breaking out of the insurrection; and, in my judgment, it speaks wonders for the ease with which this country may be governed in normal times, that we have had comparatively so little disorder since the surrender of the insurgent arms in April. Civil government was completely established in the Filipino provinces throughout the archipelago in July of this year, and since that time an American soldier has not been called upon once to discharge his weapon. The country has been policed by the constabulary, a force of some 5,000 or 6,000 men. It may be that as the conditions grow worse—for they are likely to do so before they grow better—it will be necessary in a province like Cavite, where ladronism seems inbred in the people, to proclaim martial law and even to call in the military finally to suppress it; but it is still hoped that this may be avoided. There are two provinces in the southern islands that are also badly infected with ladronism—one the province of Iloilo, where, however, the constabulary are rapidly stamping it out, and the province of Negros, where all the mountaineers have ever been ladrones. They have been much diminished in number and have received some severe lessons, but it will be a work of patience and time before they can be wholly suppressed. The ladrones of Iloilo are an organized band of cattle thieves, for all the cattle that they can steal they can sell at good prices in Negros, and some presidentes of towns are not above receiving profits from this business.

The failure of a crop for a year may entail great hardship and bring about a famine, but the coming year generally restores a normal condition of prosperity. Such, however, is not the present case in these islands. The loss of the carabaos can not be remedied in a year, and unless the greatest efforts are made either to replace these animals from other countries or to substitute methods of agriculture which shall prevent their being indispensable hereafter, the future for several years offers a gloomy outlook. I have instituted inquiries to learn the possibility of importing carabaos. It has not been possible to do this until the present time, because the previous importations of carabaos made within the last five months resulted only in the death of the animals brought here. The fields of the country are infected with the rinderpest, and animals turned into them have caught the disease and quickly died. The secretary of the interior advises me that the bureau of laboratories have succeeded in the production of a serum which will immunize 98 per cent of the cattle upon which it is used from the rinderpest for several years. This serum will be used upon several hundred cattle to determine whether it is really efficacious, and if it turns out to be so I shall call upon the Commission for authority to purchase as many thousands of cattle as possible, to distribute them among the provinces and to sell them there at cost. Meantime it is hoped that other agricultural methods will be taught to the people and the use of modern machinery made feasible. The experiments in Batangas, to which the secretary of the interior refers in his reports, are full of interest and instruction upon this point, but it is not necessary for me to dwell upon them.

The insurrection is over. It is true that the ladrones, though they live on nothing but cattle and rice stealing, and never attack American soldiers, and prey only upon their own people, do masquerade as insurrectos; but they recognize no authority and have no characteristics other than those of banditti. They have stirred up in some of the provinces the organization of so-called secret societies for the purpose of securing agencies with which successfully to conduct their robbery and to sell the fruits of it. In other parts of the country, notably in Tayabas and in Samar, the restlessness succeeding the war, and the poverty and difficulty of living, have induced many of the ignorant and superstitious people to withdraw to the mountains, under the leadership of leaders who profess to have divine attributes and to have the assistance of God in the protection of their followers. The people thus drawn out become religious fanatics and robbers at the same time. Such a band was that of Rios in Tayabas, and its history is typical. Rios was the captain of an insurgent company under Colonel Zurbano, who commanded in Tayabas, and was one of the officers of General Cailles. Rios was a blacksmith, or blacksmith's assistant, entirely illiterate. Having committed a murder, and fearing punishment for it, after his surrender he went to the mountains, and was there able to summon a few people to his assistance. He gave it out that he would go to heaven, and returned and came down out of a tree in the presence of a large number of his followers bearing with him a box which he said if they assisted him he would open and confer on them what was contained in it—independence. He organized a town or two and preyed on all the other towns in the mountainous parts of Tayabas, and became such a nuisance that the larger towns formed companies of volunteers, and they, with the assistance of the constabulary, so harried his followers that most of them are now dispersed and surrendered; and he is in hiding with only one or two persons.

The picture that I have given of the depressed condition of agriculture, and the tendency to ladronise in the Tagalog provinces and in some of the Visayan provinces, does not apply to those provinces in which hemp is the chief product. They are wealthy and prosperous, and while their food costs them more than it used to, they have money enough with which to make improvements, and schoolhouses are being built, roads are being constructed, machinery—agricultural and of other kinds—is being introduced, and there is every evidence of a decided forward movement. This is especially true of the province of

Albay, which is the largest hemp-producing province in the islands. Throughout the rice and Tagalog provinces, however, we must expect disturbances from time to time from ladrones and their assistants, the Katipunan societies. In the northern provinces of Luzon, in Ilocos Norte and Sur and Union, and in Cagayan and Isabela, conditions are much less disturbed by ladrones. The provinces depend more on the tobacco and corn crop than they do on the rice crop, and the Ilocanos and others who live in the provinces were not in the past so much given to ladronism. On the whole, however, there is before us a year of the hardest kind of work relieving the people from the hardship and suffering that are likely to follow the failure of the rice crop, and in suppressing ladronism and other disturbances due to economic distress.

The wealth of these islands must always be in their agricultural products, and when more than three-fourths of their chief food crop is wanting, it is to be expected that the market for the sale of goods from foreign countries will not improve. In the face of these most distressing conditions, however, the importations into the islands for October, 1902, were greater than ever before in their history for one month. It has been suggested that this growth in importations is due chiefly to an increase in rice, but the statistics when examined do not bear out this interpretation of the facts. The rice imported in October of last year was about 20 per cent of the total imports. The rice imported for the same months of this year is not more than 1 per cent of the total imports. The figures show that for the year ending June 30, 1902, the imports, exclusive of quartermasters' stores, of all goods were $41,000,000, while the exports were about $27,000,000. While $1,100,000 of this is explained by the greater importation of rice, the remainder can only be explained by the additional investment of capital in business, in equipment, and in construction. In the fiscal year 1900 the excess of imports over exports was $1,130,305; in the fiscal year 1901 it was $6,257,321, and in the fiscal year 1902 it was $13,896,477. Capital has seemed, because no very large enterprises have been undertaken, to be timid in coming here, but in fact it has come in a small way in various branches of business, so that the aggregate is very considerable.

The explanation of the greater amount of imports over exports from the islands is not to be found chiefly in the fact that much money has been brought here from America through the army and its payments. Doubtless that has something to do with it, but this cause was necessarily much more effective in the year ending June 30, 1901, than it was in the year ending June 30, 1902, because the army in the islands was being rapidly reduced in size during the year and the expenditures were considerably less in that year than in the previous year; and yet the imports increased nearly 35 per cent in the year 1902, and the total business of the islands increased from $59,000,000 in the fiscal year

ERRATA.

On page 20, line 23, instead of "not more than 1 per cent of the total imports," read *not more than 18 per cent of the total imports.*

1901 to $69,000,000 in the year 1902. Of course the change in tariff increased the amount of importations. That was its purpose, but it does not diminish the importance of the fact that business and the investment of capital have shown a steady increase. That they would have shown a much larger increase had agricultural conditions been only ordinarily favorable goes without saying. For the current year, I think we may anticipate a considerable reduction in imports and revenue. Such, at least, is the opinion of competent brokers, merchants, and importers. The prostration of agriculture is too great. The savings of the people will be expended in buying food.

Among other ills from which this country is suffering is that of the fluctuating currency. The evils of this have been dwelt upon in the report of the secretary of finance and justice and need no emphasis from me. I may be permitted to say, however, that the depreciation in silver has greatly increased the apparent cost of living to the very poor, and has added much to the causes for their discontent with present economic conditions. With all these woes which have come to this country, the Filipino people look to the American nation for the very great aid which will be furnished them in a better market for their products of sugar and tobacco by reducing the Dingley rates to not more than 25 per cent thereof and by giving the islands a stable gold-standard currency.

THE LABOR QUESTION.

The complaint of the American and foreign merchants in these islands that the labor to be had here is altogether inadequate has become acute, and the chambers of commerce representing the American, Spanish, English, German, and other foreign interests, have sent a representative to the United States to invite an amendment to the present Congressional legislation which extends the Chinese exclusion act applicable to the United States to these islands, on the ground that it is necessary to admit Chinese for the business development of this country. On the other hand, it is quite apparent from the declarations of the Federal party and other political organizations in the Philippines, and from the vigorous manifesto of the only labor organization in the islands, that there will be much opposition on the part of the Filipino people to the further admission of the Chinese. That this opposition has been chiefly due to the competition which the Chinese have offered in the matter of stores and trading is obvious to anyone who has looked into the question; but it would be unwise to infer from that that the introduction of Chinese as laborers here would not be a very unpopular policy on the part of the Government.

The Chinese laborer becomes a merchant within a year or two after he reaches these islands, and then begins a competition with the Filipino tradesman which in the end drives the Filipino out of business.

Were there unlimited Chinese immigration into these islands, I do not doubt that the tendency would be to relegate the Filipino to the position which the Malay occupies in the Straits Settlements. Most of the avenues of business would be commanded by the Chinamen, as they now are in Singapore and the Straits Settlements, and the islands would ultimately become rather a Chinese country than a Filipino country. It is doubtless true that were the doors opened and the Chinamen allowed to come in freely, it would tend toward a much more rapid commercial and industrial development of these islands than we are now likely to have; but in this respect I think the merchants and others interested would be disappointed in the trend which affairs would take. It has not been possible in Borneo to introduce the Chinaman into the fields; he has declined to become a farmer or a farm laborer in that island, and as the conditions are very similar to those which prevail here, we may expect the same result. There are to-day, although there may be 100,000 Chinemen in the islands, but very few engaged either in farming or in laboring upon farms. The attention of the Chinaman is given either to coolie labor or skilled labor in cities or to the tending of stores and to commercial business. It is quite possible that the admission of Chinamen would reduce the wages of the stevedores, of the domestic servants and of coolies in the cities, but there is grave reason for doubting how efficient the Chinaman may be in the carrying on of farming operations.

During the year 1902 there has been a movement for the organization of labor in the city of Manila, which doubtless will spread to other parts of the islands. It has been regarded, because of abuses which crept in, as an unmixed evil. I can not think it to be so. If properly directed, it may greatly assist what is absolutely necessary here—to wit, the organization of labor and the giving to the laboring class a sense of the dignity of labor and of their independence. The labor organization in the city of Manila is very much opposed to the introduction of Chinese labor, and their declarations upon this point will find ready acquiescence in the minds of all Filipinos with but few exceptions. The truth is that from a political standpoint the unlimited introduction of the Chinese into these islands would be a great mistake. I believe the objection on the part of the Filipinos to such a course to be entirely logical and justified. The development of these islands by Chinamen would be at the expense of the Filipino people, and they may very well resent such a suggestion. The merchants and others who wish to invest here must take into consideration that labor is always likely for some time to be more expensive in these islands than it is in the United States per unit or product of labor.

Another phase of the labor question which does not seem to have had its proper weight with the merchants of Manila in their demand for the admission of Chinese coolies, is the great obstacle which such a policy would present to the opening by the United States of its markets to Philippine products. The existence of cheap Chinese labor in these islands would furnish the strongest and most taking argument to those whose interests lead to their opposition to the reduction of the tariff, that the reduction would bring American labor and its products into direct competition with cheap Chinese labor and its products in these islands.

The evidence with respect to the efficiency and quantity of Filipino labor is quite conflicting. I append as exhibits (F 1 and F 2) to my report the reports of Major Aleshire and Captain Butt, in the quartermaster's department of the United States Army, who have had large numbers of Filipino laborers under their control and who have been quite successful in making them useful. I append also the report of the municipal board, and report of the city engineer of Manila, who has employed a great many Filipinos constantly, and whose evidence, generally, supports that of Major Aleshire and Captain Butt. I append also, marked "Exhibit F," the last report of the engineer upon the Benguet road, which shows very great discouragement in the use of Filipinos for the construction of public works in the country. I ought to add on the other hand that the manager of the Manila and Dagupan Railway Company has informed me that his road was constructed by Filipino laborers almost entirely, except that at one time they brought in quite a number of Chinese for the construction of bridges and the working upon the piers. The Chinese did not prove to be satisfactory, and Filipino laborers had to be substituted. On the other hand, the merchants of Manila claim that they find it very difficult to secure satisfactory labor or constant labor, and that the rates of wages are absurdly high. It is to be taken into consideration that these comparisons of wages and labor are made as to the efficiency with American labor, and as to reasonableness of price with the very low wages paid to Chinamen in Hongkong. Everything is high in Manila. The cost of living is very high, and it is not surprising that the cost of labor should have risen. The very great increase in the foreign commerce and coastwise trade in these islands, together with the needs of the army and the insular government, has caused a corresponding increase in the demand for all kinds of labor in and about commerce, so that the increase in wages and failure of the local labor supply are easily understood.

I do not think it would be just to the Filipinos, or a proper course for America in the development of this country, to do more than to extend to the Commission the power to admit, upon reasonable restrictions, a certain limited number of skilled Chinese laborers, who may contribute to the construction of buildings and the making of other improvements, and who at the same time by their labor may communicate to Filipino apprentices the skill which the Filipinos so easily acquire. Such skilled laborers might be admitted under bond of their employers that they shall be returned to China at the end of three or five years, the bond containing a provision also that for every Chinaman imported and employed a Filipino apprentice should be employed. Further than this it seems to me that it would be unwise to go. But such a provision would probably bring about the establishment of shipyards here and other enterprises that now are impossible in the Philippines because the proper skilled labor is not to be had.

I am myself by no means convinced that Filipino labor may not be rendered quite useful. The conditions of war and of disturbance throughout the islands for six years have led the men to form loafing and gambling habits and have interfered with their regular life of industry. Where such restlessness prevails industry is apt to be absent. The Filipino laborers must be given three or four years before an intelligent and just verdict can be pronounced upon their capacity for effective labor. I am confident that it will be greatly better than the suffering merchants of Manila anticipate.

A just view of the future of labor in these islands can not be taken without considering the dependent condition of the Filipino laborers in Spanish times. Much of the labor was then forced, and there was not a single circumstance that gave dignity to it. The transition from such conditions to one where the only motive is gain must necessarily be attended with difficulty; but when the laborer shall come to appreciate his independence, when he shall know that his labor is not to be a badge of peonage and slavery, when American influences shall make him understand the dignity and importance attaching to labor under a free government, we may expect a great change for the better in the supply and character of labor.

THE FRIARS' LANDS.

On my return to the United States I was directed by the President and the Secretary of War to visit Rome and confer with the Pope on the subject of the purchase of the friars' lands in these islands, and the possible withdrawal, at the instance of the Pope, of the Spanish friars from the Philippines. The result of those deliberations is contained in the correspondence between Cardinal Rampolla, the papal secretary of state, and myself. I have submitted that correspondence unofficially to the members of the Commission, but as it has already been forwarded to the Secretary of War, and should be made public, if at all, by either the Secretary of War or the President in his communications to Congress, I do not feel justified in inclosing it as an exhibit to this report, and have only to say concerning the visit to Rome and the negotiations there that I believe they will tend to bring about a much earlier and a much more satisfactory solution of the difficult questions at issue between the Roman Catholic Church and the Government of the United States in these islands than if the visit had not been made and the conference had not been had.

OFFICE OF THE EXECUTIVE SECRETARY.

The executive secretary presides over that office, which by the terms of the law was designed to relieve the governor from the routine executive work. It has been found possible to do almost all the clerical work of the four departments, as well as the governor's office, through the executive secretary and his subordinates.

Mention has already been made in a previous Commission report of the excellence of the work of Mr. Fergusson, the executive secretary, especially in his marvelous power of interpreting to and from English and from and to Spanish during the trip of the Commission through the provinces to organize them. Mr. Fergusson is now in the United States on leave and his place has been taken by the assistant executive secretary, Mr. Beekman Winthrop. I can not speak too highly of the excellence of Mr. Winthrop's work. The intense interest that he takes in the dispatch of business, the amount of responsibility that he saves the civil governor and the heads of the departments, form a reason for constant congratulation; and the work which he has done in the preparation of the very detailed appropriation bills is worthy of the highest commendation, and entitles him to the unqualified approval and gratitude of the hard-working members of the Commission.

It has been suggested by Mr. Winthrop that it will be possible in the near future to unite in the office of the executive secretary the clerical work and the translating, which has now to be done in the office of the Philippine Commission. As the executive secretary's office and the Philippine Commission office are in the same building, this may prove to be not only a practical but an economical suggestion. No one but one familiar with the work of the two offices can realize what the burden of clerical work and of translation and interpretation is in the conduct of the business of the Government.

The functions and operations of the executive secretary's office are admirably set forth in the report of Mr. Beekman Winthrop, which is here appended, marked "Exhibit A."

PROVINCIAL GOVERNMENTS.

Conditions changed so rapidly during the last year in the provinces that the statement made in the annual reports of the governors in January, 1902, gives hardly a fair picture of their conditions at present. It would seem wise to change the time for the annual report of the governors from January to September. Many of these annual reports filed in January, 1902, are included in the evidence taken by the Senate Committee on the Philippines, but as the reports were made subsequent to the last report of the Commission, it seems proper to include them as exhibits to this report, and they are hereto attached as "Exhibit B."

The provincial governments have upon the whole worked well. Their financial condition is very fully set forth in the report of the secretary of finance and justice, and even more in detail in the report of the auditor, which is made an exhibit of the secretary's report. A sufficient surplus over the current expenditures of the government has not been accumulated in many of the provinces to make substantial improvements in the roads and bridges, and it is very possible that contributions from the insular treasury will be necessary to bring this about.

The land tax has not added greatly to the income of the provinces, and was not expected to do so, because the limit of per cent of the tax was made so low. Under no circumstances is the provincial board, or are the municipal councils together, able to tax any land in the provinces, in the aggregate, more than seven-eights of 1 per cent of its value. The assessment of the land tax has been made generally through the islands. As might have been expected in the introduction of a new system of taxation, the assessments have been quite defective. Local officials have permitted their friendships and enmities to influence in an absurdly grotesque way their assessment of property, and the persons injured, not being sufficiently advised of the time limited for appeal, have failed to appeal within the required period, and lost their rights thereunder. It will be very necessary, therefore, to give everyone an opportunity to have the assessment reviewed; but it has been a great step to have the assessment taken, and it is not at all impossible to remedy much of the injustice which has been done, by additional curative legislation.

In some of the provinces there is considerable complaint against the land tax, and we find it chiefly in those provinces where there are extensive landowners, who never have been used to paying any tax upon their lands at all and who seize upon the present discontent with reference to agricultural conditions to raise a cry against the land tax with the hope that the system may be wholly abolished. In some cases the provinces, which are evidently in bad condition, have been relieved from the land tax for one year. This has been the case in Batangas and Samar. It is possible that the conditions of agriculture are so very bad in many of the provinces that similar relief will have to be granted for the coming year. But that a land tax, as a system, must be continued in this country, if the provinces are ever to be efficient governments, is certain.

There has been great difficulty in filling the offices of supervisors in the provinces. The salaries are not such that we can secure the services of any but the younger engineers, and when they find that the resources of the provinces are not such as to justify large improvements they frequently lack energy and do nothing. This is partly accounted for by the fact that heretofore they have had no central supervision, as the treasurers and provincial fiscals have. I am clear that the work of the supervisors will be greatly improved if they are put under the chief of the bureau of engineering and construction and a particular assistant of that officer is charged with the duty of visiting the provinces and supervising their work. The system of supervision by the insular treasurer over the provincial treasurers and of the promotions which he has secured for those who have done their work well has made the provincial treasurers a very efficient body of men. They have very heavy labors, and these labors are discharged generally in a satisfactory way. A similar result can doubtless be brought about in respect to the supervisors. The fiscals have been put under the supervision of the assistant attorney-general and supervisor of fiscals. The poor ones are being weeded out and the provincial governments strengthened.

The native governors on the whole have proven to be quite satisfactory. They take great pride in their provinces, and with the exception of two or three who seem to be listless and fearful of making enemies, they are exerting all their influence, which is very great among the people, to industry and law-abiding habits. It will probably be necessary to remove two or three governors in whose provinces there is too great looseness of administration and too much lawlessness, in order to point out the responsibility that a provincial governor should have in such matters. The provincial governor is the disciplinarian of the municipal presidentes, and as such is therefore able greatly to improve the conduct of affairs in the municipalities. If he has a number of friends in the offices who do not realize their responsibility to the public and are not disciplined because of the governor's friendship, it is very easy for the province to fall into bad condition. If, however, he uses his authority for good government, as many of them do, he can retain a very strict control over the entire population for good.

It will probably be necessary in some of the smaller provinces to dispense with the office of supervisor by uniting it with the office of treasurer, because the salary that would secure a good engineer as supervisor can not be paid. The organization of the provincial boards of health is properly treated of in the report of the commissioner of public health under the secretary of the interior. Suffice it to say that this has added one more to the list of provincial officers. The recent change in the school law provides a division superintendent for almost every province, his salary to be paid by the insular government. This makes another provincial officer whose services may be used in the general government of the province when occasion shall require. It has been proposed, in provinces where there is no supervisor, to make the division superintendent of schools a member of the provincial board. I believe that this plan would work very well. The power of the provincial boards in matters of health and education and in assisting agriculture have been somewhat added to by legislation, but sufficient time has not elapsed to be able to give a judgment upon the wisdom of these provisions.

CIVIL-SERVICE BOARD.

The report of the civil-service board shows that it has been most active in the conduct of examinations and the furnishing of eligible persons for the public service. The principle of appointment according to merit, as shown by examination, and of promotion according to merit, as shown by experience and examination, is carried out conscientiously by the board. The necessity that the government is under of securing many of its civil servants from the United States by examination under the auspices of the United States Civil Service Commission, of course delays the filling of vacancies and embarrasses the conduct of the government. This embarrassment and delay, however, are reduced as bureaus become better established and the number of new employees that are needed becomes less. It is entirely natural that heads of bureaus should think themselves better competent to judge of the kind of men needed for the vacancies under them than the civil-service board; and this is especially the case with new bureaus where the head of the bureau has had no experience in the selection from eligibles presented by the civil-service board. The provision that no money can be paid by a disbursing officer to a person not appointed in accordance with the civil-service law has been sufficient to restrain any violation of it. It has become so well understood that the merit system prevails in these islands, and has a wider application and more practical enforcement than in any part of the United States, that there is no political pressure from the United States for the appointment of persons to the classified service.

The body of civil-service employees engaged in public school teaching is still not included within the rules of the civil-service board. Some 200 of the legalized quota of 1,000 teachers are to be appointed in the near future. As soon as the quota has been filled it is understood to be the intention of the Commission to provide that thereafter no teachers shall be employed who do not pass a civil-service examination.

During the next year it is hoped to introduce into the civil-service law provisions by which the learning of native dialects and the learning of Spanish by American employees will be encouraged, provisions by which certain promotions can only be obtained after passing an examination in certain native dialects, and also for increasing the salaries of employees who are able to pass an examination in such dialects or in the Spanish language without promotion. Such changes, it is thought, would make the body of our English speaking civil servants much more efficient.

Particular attention is invited to the satisfactory report of the civil-service board, a copy of which is attached as "Exhibit C."

INSULAR PURCHASING AGENT.

The office of the insular purchasing agent was created for the purpose of economy and efficiency in the purchase of necessary supplies, both for all bureaus and departments of the insular government, as well as for the provincial and municipal governments. When the office was first organized, with the requirements that all goods should be purchased through it by the various branches of the government, the utmost confusion reigned in the office because of the immense number of requisitions and the inability of the purchasing agent to meet them promptly. During the last year, however, order has been brought out of chaos, and it is now possible for any bureau to secure promptly what it desires through the insular purchasing agent. He has a large stock on hand of things likely to be needed by the various bureaus and provinces, and he has the means of securing quickly those articles which he has not on hand.

The question of how goods shall be bought in the United States, whether through a purchasing agent stationed there or by correspondence through the insular purchasing agent, is one that has not been free from difficulty. At present the government has an insular purchasing agent in the United States, but my recommendation is that this arrangement be terminated on the 1st of January, and that thenceforth the insular purchasing agent shall buy directly from the manufacturing houses in the United States. It is essential that quite a large fund be kept in the United States with the disbursing officer of the insular government there, and that a record of all orders and purchases be made in the Bureau of Insular Affairs of the War Department. It is thought that the suggestions of the insular purchasing agent will accomplish all these purposes and that they should be adopted. The policy of having one man buy everything for all branches of the government is apt at times to be too rigid, and the amendment which authorizes the civil governor to dispense with this necessity and allow heads of bureaus or other officers to make exceptional purchases directly has relieved the system from objections which it was at first thought might lead to its abolition.

The extent of the dealings of the insular purchasing agent is shown by the fact that his purchases from August 1, 1901, to October 1, 1902, aggregate $1,416,633.91, and his total sales have been $1,252,012.36, and his total property on hand amounts to $263,465.14; all in United States currency.

The report of the insular purchasing agent is attached hereto, marked "Exhibit D."

THE CITY OF MANILA.

The plan for the government of the city of Manila has not been changed during the present year, and the government has been carried on successfully. The city of Manila is well policed. It is impossible in a country where gambling is so much a vice to prevent corruption from affecting the police force in some degree. The number of the force has been considerably reduced since its organization under the military government, and it is hoped that, as the Filipino policemen become better trained, it may be still further decreased. The work of giving the city an adequate water supply and a proper sewer system has not yet begun. The Philippine act enabled the Commission to issue bonds for $4,000,000 gold to better the water supply and to establish a sewer system. It is believed that a competent engineer has been engaged in the United States for this work, but the plans can not be adopted until careful study has been given them and they have been submitted to a board of engineers.

Much difficulty has been experienced in securing proper stone for macadam, the quarries at Binangonan having become exhausted. It is now thought that the Talim quarry on the island of Talim, in Laguna de Bay, which is owned by the government, will furnish very good material. The city has experienced the same difficulty in securing engineers that has confronted the insular government with respect to supervisors in the provinces, and much delay is incident to the failure promptly to procure them. A very considerable amount of work has been done in improving and cleaning streets and in putting the city in better sanitary condition. Four very handsome markets, an important feature in the life of the common Filipino people, have been erected in different parts of the city and are the source of a considerable income to it. A satisfactory steel bridge, called the "Santa Cruz" bridge, has been constructed across the Pasig and adds much to the public convenience.

Much, however, remains to be done. I desire to call attention to the fact that the Philippine act in authorizing the issue of bonds by the Philippine government for use of the city of Manila does not provide that those bonds shall be free from State, county, and municipal taxes in the United States, though the act does so provide with respect to bonds to be issued to pay for the friars' lands. Such an exemption of all Philippine bonds from State, county, and municipal taxes will enable us to sell them at a very considerable lower rate than we can place them at under present conditions, and I suggest that we recommend to Congress that all bonds issued by authority of the Philippine act shall be free not only from Philippine and United States taxation, but also from State, county, and municipal taxation in the United States. This government is an instrument of the United States in working out a great and most important problem. It is an agency of the United States, and it seems proper that the successful maintenance of such an agency should not be embarrassed by State taxation upon the bonds which, in the prosecution of the purposes of the United States, it is obliged to issue.

The land tax in the city has been levied and collected. The work of assessing the value of the real property has been onerous, and many complaints are made of the injustice of the assessment in the outlying portions of the city. It seems probable that injustice has been done in estimating what ought to be assessed as acre or hectare property by the square meter, and a reassessment or an opportunity for reassessment ought to be furnished by legislation at once. An examination of the report on assessments and collections will show that while there are in the city real estate and improvements assessable for taxation amounting to $41,005,190.60, there is nonassessable real property in the city of the value of $25,502,329.54, of which $13,384,388.60 is the value of public property, not including the streets and parks, and $12,117,940.94 is the value of church property, which, under the law, is exempt. Of this church property but $2,737,423.90 is the value of land and improvements belonging to the archbishop or the Roman Catholic Church proper, while the remainder, $9,380,517.04 is the value of property belonging to the religious orders, religious schools, and convents.

The subject of public instruction in the city of Manila has been sufficiently covered by the report of the secretary of public instruction.

The fire department of the city is rapidly being rendered as efficient a service as there is in the Orient, and will, when completed, in the course of a few months bear comparison with the fire departments of cities in the United States. The full report of the municipal board is hereto annexed, marked "Exhibit E." Especial attention is called to the very large number of new buildings that, in spite of the very high prices of labor and material, are being erected in the city.

BENGUET.

The Commission has been very much disappointed in the difficulties it has encountered in the construction of a wagon road from Pozorubio in the province of Pangasinan to Baguio in the province of Benguet, a road which is essential to the use of Benguet as a site for a sanitarium and for the recuperation of the health of civil employees. The engineer, Captain Mead, who made the first survey of the road and entered upon its construction, made an error in placing the road at such a level that it had to be constructed through friable rock at a great height above the bed of the Bued River. On this grade it was most difficult to maintain a proper slope for the fills, and the rainy season with its accompanying landslides washed the road away along 5 miles of its course. A different course for this distance has now been adopted, carrying the road nearer to the river along a course where it is chiefly hard rock, and where there is no difficulty in maintaining a proper slope even against the hard rains of the wet season. The road has been constructed from Pozorubio on the one hand and from Baguio on the other, so that the two ends are within 12 miles of each other, and it is hoped that during the coming winter a horse trail can be constructed to join the two parts and that by next summer the whole wagon road will be completed. The original estimate for the cost was $75,000, but the actual cost has already greatly exceeded that sum and it is doubtful whether it can be constructed for less than $300,000. The work on the road was stopped for three months on account of cholera. I append the report of the engineer in charge of the work and call attention to the difficulties which he has encountered in the employment of labor. The report is marked Exhibit F.

DEPARTMENT OF COMMERCE AND POLICE.

I come now to the bureaus which are included in the department of commerce and police.

CONSTABULARY.

The first and for the time the most important bureau of this department is that of the constabulary. Since the 4th of July, last, when the civil governments were established throughout the Christian Filipino provinces and the military control therein ceased, not a single shot has been fired by an American soldier in the preservation of peace and order, and no request has yet been made of the commanding general for assistance in the suppressing of lawless violence or disturbance. The preservation of peace and order has been wholly committed to the constabulary and to the municipal police. The constabulary number something over 5,000 men and the appropriation bill passed for the ensuing quarter authorizes the increase of this number to 6,000 men. The municipal police generally are by no means well disciplined.

It was the intention of the Commission in passing the law providing for the organization of the constabulary that the inspectors should devote much of their time to the discipline of the local police, but the calls upon them for the suppression of ladronism and other disturbances have been so numerous that there has not been time or opportunity for the improvement of this important municipal arm of the forces of law and order. The towns, many of them, are so poor that it is impossible for them to support a large or even adequate police force. In order that the municipal police should be effective against ladrones it is necessary that they be properly armed with rifles. In a town, however, which can only afford five or six municipal policemen the distribution of rifles to the police only offers a temptation to large bands of ladrones to capture the police and take their rifles, thus increasing the number of arms held by the ladrones. In some provinces, notably in the provinces of Tayabas and Bulacan, the constabulary and the local police under the governor have worked together with great success. Ladronism in those provinces is being rapidly stamped out. In the province of Bulacan, Colonel Tecson, a former insurgent officer elected governor, has devoted his entire time and energy to the organization of a volunteer force, which has chased the ladrones to the mountains and out of his province so effectively that in a short time that province, which has always been noted for ladronism, will be freer from it than ever in its history. The arms for such volunteer forces are always distributed by the constabulary. In Tayabas the system followed was by volunteers from the towns. The authorities of the town induced the people of the smaller barrios living near the mountains exposed to attack from the ladrones to come into the thickly inhabited settlement, bringing their belongings, and leaving nothing from which the ladrones might secure sustenance; in other words, they have adopted a reconcentration policy on a small scale, and the effect of that has been to bring the ladrones in from the mountains to surrender in considerable numbers, and the province is being rapidly rid of this human pest. The conditions in Cavite, however, have not been so favorable, and it is with the greatest reluctance that any rifles are distributed to the municipal police, because the sympathizers with the ladrones in the towns are so many that the rifles may be stolen.

There have been four desertions from the constabulary in Cavite which resulted in the loss of some six or eight rifles. The chief of the constabulary has deemed it wise to discharge twenty men enlisted in the neighborhood of San Francisco de Malabon and Imus lest they might also desert. The governor has applied for 300 Krag rifles for use with his volunteers, but it is doubtful whether there is a sufficient guaranty that these rifles will not find their way into the possession of the ladrones to justify the risk. In Zambales the governor, in an earnest desire to suppress Roman Manalang, a ladrone of ten or fifteen years' reputation, a murderer and a desperado, has asked for 50 rifles with which to arm a body of volunteers made up of the better educated and wealthy men of the province, in the confident belief that he may capture Manalang and end the lawlessness in the northern part of that province, of which the outlaw is the chief promoter. Judge Johnson, of the court of first instance, has sentenced to Bilibid Prison for long terms, from three to twenty years, about one hundred of Manalang's men, and this, it is thought, will have a quieting effect in that mountainous and most difficult province. The work of the constabulary has been so constant that time has not been given even to the thorough discipline of the enlisted men. Their work has been exceedingly heavy and burdensome, and, on the whole, the chief, the inspectors, and the enlisted men are to be, as a body, highly commended. There have been from a number of provinces complaints made of abuses by the enlisted men of the constabulary.

It is a fact so common that it must be noted that Filipinos of the less educated class with a little authority are prone to use that authority to oppress their fellow-Filipinos, and the abuses of the constabulary are almost wholly committed by individual members of that body when not under the immediate observation and control of American inspectors. Of course, the abuses of the constabulary are very grossly exaggerated by deliberate misrepresentation of persons whose sympathy and profit are with the ladrones, and who do not welcome the presence of the constabulary on any ground. Another difficulty has been a lack of tact on the part of some of the American inspectors engaged in the provinces. The authority which they exercise over the constabulary of the province, which generally is the only effective police body, is apt to make them feel independent of the governor of the province, especially if they are young and inexperienced; and when they do not think that they find in the native governor the active, energetic assistance which they are entitled to, they conduct themselves in a manner not calculated to conciliate the governor or to secure any useful cooperation by him. It has been my steady effort to convince these inspectors that next to dishonesty and cruelty a failure to show proper respect to the governor of the province and to accord to him the courtesy which the dignity of his office requires will be considered the greatest dereliction of duty of which they can be guilty and will be cause for instant dismissal. The chief of the constabulary has great difficulty in securing the proper material for provincial and other inspectors, but on the whole he has succeeded remarkably well.

The constabulary, because of the large number of posts in the islands, has proved to be the most efficient corps for the maintenance of a civil commissary and the distribution and sale of goods to civilian employees throughout the archipelago, and this has entailed great additional work upon the force. The constabulary are quite dependent upon the telegraphic system for efficiency, and therefore as the military turn the telegraph lines over to the civil government they are placed under control of the signal officer detailed for work in the constabulary bureau. Ultimately it is the purpose of the Army to turn over to the civil government all the telegraph lines. More progress has really been made in the development of telegraph lines than in almost any other commercial direction in these islands. It is possible now to reach by telegraph the capitals of all the Christian provinces except Romblon and Paragua, and it is also possible to reach all the principal towns of Mindanao and in the Jolo group. Romblon will soon be reached by cable and then only one Christian Filipino province will be beyond the reach of the central government by wire. Such facilities for immediate communication with the governors greatly promote the efficiency of the government.

Through the kindness of General Davis the old Spanish cavalry barracks, known under the present government as the "pony corral," has been turned over to the chief of constabulary for his headquarters. He proposes to maintain a reserve of constabulary of 150 or 200 men in the city of Manila, drilling them and keeping them here so that they may be used in any province where an emergency may arise. He will also organize, under authority of the appropriation bill for the quarter ending January 1, 1903, a constabulary band. The excellence of the work done by the constabulary, not only in its police but also in its civil, commissary, and telegraph lines, bears admirable witness to the exceptional executive ability of the chief of the constabulary, Capt. Henry T. Allen, of the Sixth Cavalry. His report is hereto attached, marked "Exhibit G."

BUREAU OF POSTS.

On July 1, 1901, there were 24 regular post-offices in the islands. On June 30, 1902, 66 had been added, and since the close of the fiscal year the number has been increased to 160. There has been an increase in the postal revenue of the islands of about $15,000, but of this $11,462 was from money-order fees, so that there was less than 3 per cent increase in the ordinary revenues. The expenses were 16 per cent greater. This was due to the fact that by act No. 179 it was provided that the registration and carriage of official mail of provincial officials from one point in the Philippine Islands to another should be free of charge. In the many extensions of civil government and the immense amount of mail transmitted for public purposes, it has come about that more than one-half the whole mail matter handled is governmental. There is an increase of more than 20 per cent in the bulk of the mail. The money-order service in the islands is becoming of great importance. Both Chinamen and natives are beginning to use it for comparatively large orders. In the United States the average money order is about $8, in the Philippines it averages $50. The remittances to Manila from the provinces to meet money orders issued during the year amount to $1,070,937.97, while the remittances from Manila to the United States amount to $648,125. This shows the balance between the orders drawn both ways.

Another use which is being made of the money-order branch of the post-office department is as a deposit of funds. There is about $600,000 now deposited in the post-offices for safe-keeping. This, it seems to me, is a significant fact tending to show that it would be wise for this government to establish throughout the country postal savings banks. When we consider that there are no banks at all in most of the provinces, and that there is much insecurity in holding money, and when we know that a vast amount of silver is buried in the ground to avoid robbery by the ladrones and other thieves, we may justly suppose that the institution of postal savings banks would not only benefit those who now save money in this irregular way, but might induce others to save that which for fear of loss they now spend or waste. I respectfully commend the matter to the early attention of the Commission. The report of the director of posts is hereto attached, marked "Exhibit H." The postal service is by no means as complete as we hope to make it, and has not yet had the assistance of the new vessels of the coast guard and transportation bureau.

COAST GUARD AND TRANSPORTATION.

We have alluded in our former reports to the difficulties in carrying on this government presented by the absence of water transportation from one point to another and from one province to another and from one island to another throughout the archipelago. We foreshadowed our purpose in our previous report of purchasing fifteen vessels with which to meet the necessities of the revenue, postal, and constabulary bureaus, and of the provincial governments. The Commission contracted for the construction of ten vessels 148 feet long by 25 feet beam, and five vessels 140 feet in length by 25 feet beam. The bureau of coast guard and transportation was provided for by law and organized with a naval officer, Captain Marix, detailed as its head. Captain Marix has displayed commendable interest in the work of the bureau and has been most useful in guiding the Commission in the course to take in the establishment of an island coast guard and civil navy. He was authorized to make contracts with the firm of Farnham, Boyd & Co., of Shanghai, by which ten of the vessels were to be constructed by them, and with the Uraga Dock Company, of Uraga, Japan, by which the remaining five were to be constructed by that company. The vessels are to have at least 10 knots speed. Five of the steamers have been completed, two of them have been delivered and are most satisfactory, showing a speed considerably in excess of that fixed in the contract, and three are now on their way from Shanghai to Manila. All of the steamers are to be delivered in Manila before February. The added efficiency of all governmental operations which these steamers will give, no one can appreciate unless he is familiar with the difficulties that we now experience from a lack of transportation. It will doubtless be necessary for us to purchase additional launches and other vessels for local use, but the mainstay will be the fifteen vessels above described. They have been built with unusual strength to resist the heavy seas that prevail in these waters during the rainy season.

The bureau of coast guard and transportation is vested with the power and authority to complete the construction of light-houses and supervise them. It is estimated that $200,000 will be needed to complete the construction of the light-houses which were begun by the Spaniards, and that this will take eighteen months. The great increase in trade requires new lights to be constructed according to a plan which is now being drawn up. The new lights will probably be constructed of iron framework, because this is cheaper than stone and affords quite sufficient resistance to the storms and waves. A school of apprentices has been established at Corregidor light-house in order that competent light-house keepers may be had. A report of the chief of the bureau of coast guard and transportation is attached hereto, marked "Exhibit J."

COAST AND GEODETIC SURVEY.

By an equitable arrangement between the United States Government and the Philippine government surveys are being made, under the supervision of the United States Coast and Geodetic Survey, of harbors and inlets of these islands and the coast. Considerable progress has been made, as will be seen by the report of the chief of the work in these islands. The report is appended, marked "Exhibit K."

FRANCHISES AND CORPORATIONS.

In the press of legislative work the Commission has not as yet passed a general railroad law or indeed a general corporation law, though both must be passed in the immediate future. A law has been passed providing for the granting of franchises for an electric street railway in the city of Manila, which invites competitive bids upon three points: The duration of the franchise, the fare to be charged, and the percentage of gross receipts to be paid for the franchise. Bids are being advertised for in Manila, New York, Washington, and Chicago. There is one syndicate on the ground, at whose instance the franchise law was passed after material modifications in the proposals made by it. It is not known whether the syndicate at whose instance this law was passed will now bid or not, but it is hoped that more than one bid will be received. The necessity for electric street railways in the city of Manila is most urgent. We have not yet had any proposals for railroad franchises, except a formal proposition from the Manila and Dagupan Railway to construct a line from near Calumpit in Bulacan to San Isidro, Nueva Ecija, and Cabanatuan in the same province, a distance of 71 kilometers. The Commission has not yet considered the wisdom of granting such a franchise, but has set the hearing of the petition at an open session for November 17.

COASTWISE TRADE.

On the 18th day of October, 1902, by direction of the Commission, I sent a telegram to the Secretary of War, requesting that the Executive order with reference to the coastwise trade in the Philippine Islands should be so modified as to permit the Commission to open it to all foreign and American vessels; that the transportation rates were so high as to unduly raise the price of rice and other necessary commodities, and that there was a possible pool for the maintenance of such rates. It turns out that there is no pool in the sense of a division of profits, but it is a fact that the transportation rates have been advanced to a very high figure, though they were high before, and that this has been done by an agreement by all the persons engaged in the coastwise trade. As nearly all the steamers in the coastwise trade are owned either by Spaniards, Englishmen, or Chinamen, and as few, if any, Americans had seen fit to engage in this lucrative business, it did not occur to the Commission that there could be any objections to depriving the foreigners already in the business of the monopoly by allowing other foreigners to come into it. In view of the short food supply throughout the islands, the high transportation rates have a most direct effect in increasing the suffering by increasing the cost of transporting food from Manila and other bases of supply to the provinces. A bill has therefore passed a second reading and is awaiting reading in open session, throwing open the coastwise trade until the 1st of July, 1904, to foreign vessels. It is thought that the privileges granted to foreign vessels are sufficiently safeguarded in the act to prevent their being abused.

IMPROVEMENT OF THE PORT.

The improvement of the port works has been begun this year in earnest, and the amount of work accomplished will be seen by reference to the report of the engineer in charge, Major Sears, which is appended and marked "Exhibit L."

It will be necessary in addition to the breakwaters already projected to erect a breakwater from 2,000 to 3,000 feet in length to protect ships from the waves when the wind lies in a particularly southwesterly direction. This will increase the expense over the present contracts by about $1,000,000, making the total cost upward of $4,000,000.

CONSULTING ENGINEER.

The consulting engineer has been but recently appointed under a law defining his duties, but his office has not yet been organized, as it is expected to organize it, with a view to the supervision of provincial supervisors and the construction of public works in various parts of the archipelago. The preliminary report of Mr. Beardsley, the consulting engineer, is hereto appended, marked "Exhibit M."

NOVEMBER 10, 1902.

As this report has not yet been forwarded, it seems proper to me to add a short statement concerning a movement that may have an important bearing upon future conditions, and which may, perhaps, add much to the labor of maintaining peace and order in the archipelago.

Gregorio Aglipay is an Ilocano,-and was an ordained priest of the Roman Catholic Church in these islands before the insurrection. During the insurrection he continued his priestly functions at Malolos and took such action as to bring him into conflict with the hierarchy of the church. What the merits of this controversy were I do not know. Subsequently he assumed the leadership of the insurrecto forces in Ilocos Norte and carried on a very active campaign in the mountains of that province. He was one of the last of the leaders to surrender with his forces in North Luzon. Since his surrender he has been quite active in spreading propaganda among the native priests against the so-called Friar domination of the church in these islands. The definite refusal of the Vatican to withdraw the Spanish friars from the islands was made the occasion for the formation of the Independent Filipino Catholic Church. Actively engaged with Aglipay in this movement was Isabelo de los Reyes, the former editor of an insurrecto paper, published in Madrid, called Filipinas ante Europa, and an agitator of irresponsible and irrepressible character.

Padre Aglipay has secured the active and open cooperation of a number of native priests, 15 of whom he has appointed bishops, himself having the title of archbishop. He has held mass in many different places in and about Manila; his services have attracted large gatherings of people. Most of the churches in the Philippine Islands were built by the labor of the people of the respective parishes and devoted to the Roman Catholic Church; but the people have a sense of ownership, and when a majority of them separate themselves from the Roman Catholic Church and accept a new faith, it is difficult for them to understand that they have not the right at once to dispossess the priest of the Roman Catholic Church and place in custody and use of the edifice their newly made curé. In order to prevent constant recurrence of disturbances of the peace I have had to take a firm stand with the leaders of the movement by impressing upon them that forcible dispossession of a priest of the Roman Catholic Church, for years in peaceable possession of the church and the rector's house, is contrary to law, and would be prevented by the whole police power. The leaders of the movement assure me that they have no desire to violate the law and wish to keep within it, but that their followers at times are hard to control. I have said to them that if they claim title to the churches they may assert it through the courts, and if successful will secure not only the confirmation of their title but actual possession.

In the case of a church at Pandacan the women of the parish, in the temporary absence of the priest, took possession of the church, obtaining the keys, and Father Aglipay celebrated mass in the church. I sent for him and for his counsel and advised them of the unlawful character of the action of the women, and directed them to see that possession was restored. They promised to do so, but found the women so obdurate that I called in the women and after a somewhat lengthy discussion told them that I must have the keys. The leader of the women delivered the keys to me, with a statement that they would deliver the keys to the governor, but not to the fraile. The new priest who had been appointed was not a fraile, but was a Paulist father. They announced to me that they had separated from the Roman Catholic Church and were standing with Aglipay. I turned the keys over to the chief of police and have put the regularly appointed priest in possession of the church, and quiet now reigns there. Yesterday (Sunday) I am informed that Father Aglipay assumed the robes and functions of an archbishop, holding services in the town of Cavite and in the neighborhood.

I have taken occasion to say, whenever an opportunity occurred, that the insular government desired to take no part whatever in the religious controversies thus arising; that it would protect Father Aglipay and his followers in worshiping God as they chose just as it would protect the Roman Catholic Church and its ministers and followers in the same rights. But that, if the law was violated by either party, it would become the duty of the government to step in and restrain such lawlessness.

In the heat and zeal of religious controversies it is not always possible to prevent the followers of the movement at least from stepping beyond the law, and if the movement is to spread throughout the archipelago we may expect disturbances at various points.

The feeling against the friars, which has already been referred to in a number of reports, lends strength to this movement. The existence of the controversy at all, however, adds one more to the burdens of the insular government. There is great difficulty in maintaining a course by the government which shall not only be absolutely impartial between contending religious factions, but which shall seem to both sides to be impartial.

Respectfully,

Wm. H. Taft,
Civil Governor.

The Philippine Commission, *Manila, P. I.*

EXHIBIT A.

EXECUTIVE BUREAU.

THE GOVERNMENT OF THE PHILIPPINE ISLANDS,
EXECUTIVE BUREAU,
Manila, October 1, 1902.

Hon. WM. H. TAFT, *Civil Governor of the Philippine Islands, Manila.*

SIR: In the absence of the executive secretary, Hon. A. W. Fergusson, now en route to the United States on leave of absence, I have the honor to submit the following report of the operations of the executive bureau during the period commencing July 16, 1901, the date of its establishment, to September 30, 1902, inclusive.

As created by act No. 167, United States Philippine Commission, the function of the executive bureau is "to assist the civil governor in his executive duties." Its officers are the executive secretary, who is the bureau chief, and the assistant executive secretary. In addition to the duties naturally arising within the field of executive action, these officials are charged with certain other obligations. The executive secretary, who by law is required to possess the qualification of speaking and writing fluently the English and Spanish languages, "shall act as interpreter at the public sessions of the Commission when that body desires his presence, and shall supervise, at its request, the translation of its laws." He is also required by law, "in addition to his other duties," to "act as custodian of the ayuntamiento," the building in which are located the offices of the civil governor, Philippine Commission, heads of executive departments, and several important bureaus. The executive secretary furthermore must accompany the governor, not only upon official tours throughout the archipelago, but at all banquets, receptions, and other occasions when the services of an interpreter may be needed by the latter.

It is the duty of the assistant executive secretary to act, by direction of the civil governor, upon matters relating to the personnel of the classified service and such questions concerning the internal administration of the various bureaus which require the attention of central authority. He is required, in addition to his other duties, "to receive estimates for appropriation and to prepare and forward forms of the appropriation bills for the consideration of the Commission," and, in the absence of the bureau chief, takes over the duties of the executive secretary, except those of interpreting and translating.

Under military government the civil affairs of the archipelago were administered through the office of the secretary to the military governor, except in so far as the courts and the Philippine Commission, upon assuming their functions, took over the judicial and legislative powers at first vested in the military governor. There were on duty in that office about June 30, 1901, the following officials: The secretary (brigadier-general, U. S. Volunteers), 5 assistants (1 major and judge-advocate, U. S. Army, 1 captain and quartermaster, U. S. Army, and 4 commissioned officers, U. S. Volunteers), and a law clerk at $3,000 per annum. On July 4, 1901, upon the inaguration of the civil governor, the office of the secretary to the military governor ceased, and its purely civil duties, employees, and records were taken up by the executive bureau, as were also many duties theretofore pertaining to the office of the secretary of the Philippine Commission.

Upon the division of the several bureaus between the executive departments, it was deemed expedient to leave the Philippine civil-service board, the insular purchasing agent, and the office of the improvement of the port of Manila, as well as the provincial and municipal governments, under the direct control of the civil governor. In the interest of good administration it has been found necessary to require official correspondence between other branches of this government and the Federal Government to pass through this office, which is also the point of official contact of the United States army in the Philippines, the consular representatives of other nations, the Roman Catholic Church, and the general public with central insular authority. In addition to his multitudinous duties as chief executive the civil governor in practice takes over the duties of absent heads of executive departments, as he has at this time those of the secretary of commerce and police. Yet the executive is but one phase of the dual official capacity in which the governor is required to act, for he is also the president of the Philippine Commission. He, therefore, must devote a considerable portion of his time to the sessions of the legislative branch of government, and furthermore receive at all times the public and officials of all degrees.

From all these conditions it is but natural that the executive bureau has become in practice the office of the civil governor, and as the period of organization and reconstruction gradually gives way to that of established perfected government, it is believed that to a greater degree than at present may this bureau "assist the civil governor in his executive duties," and in no small measure lift from his shoulders the burden of detail work.

It has been the policy of this bureau to ignore no written communication received by it and, so far as possible, to give the writer satisfactory action with the greatest expedition compatible with justice to all concerned. It is endeavored invariably to reply in Spanish to persons using that language only, and in most cases each such letter sent is accompanied by an English translation, in the hope that, in the cases of government offices, at least there may be a rapid progress in the acquisition of a working knowledge of the English language as the medium of official correspondence. One of the Filipino provincial governors now uses this language almost exclusively in his letters to this office, and several other native provincial officials write short and routine communications in English. However, as in the past and must be for sometime in future, the official correspondence requiring translation is considerable in volume and important in character. Four expert translators in this office are constantly engaged in this work, and many routine papers are translated by clerks who have demonstrated capacity therefor.

During its existence the executive bureau has been required to interpret and translate from almost every known language to English. This feature has had to be given due consideration in the selection of employees, and at the present time the office is prepared to interpret and translate the French, German, Italian, Latin, Norwegian, Spanish, Swedish, Hebrew (modern), and Chinese (Amoy) languages and the Ilocano, Pangasinan, Tagalog, Vicol, and Visayan dialects. All communications upon receipt, if not in the English language, are at once translated, in order that there may be greater expedition in action.

The authorized number of employees in the executive bureau is 61, of whom 6 are assigned to the appointment and finance division, 16 to the miscellaneous (action) division, 24 to the record and mailing division, and 15 to the care and police of the ayuntamiento building.

The designation of the appointment and finance division indicates its scope. Applications for appointments are received covering the entire field of government, from the supreme bench to the most menial position in the service, as well as to countless positions which exist only in the imagination of the office seeker. These communications, as well as all others, are acknowledged upon receipt, and such information in the premises as it may be possible to impart is at once furnished. Appointments are made by the chief executive, as provided by law, of officials in the insular government, provincial governments, government of the city of Manila, courts of first instance, of the peace, and municipal organization committees. Charges and complaints against these officers and their resignations are received and acted upon by the civil governor through this bureau. This work is voluminous and of an importance demanding much of the time of the chief executive, notwithstanding the best efforts of the officials of this bureau and carefully trained employees in the preparation of the records of the cases before submission. By way of illustration of the amount of review one case alone may entail, it is sufficient to mention proceedings of provincial boards in investigation of charges against municipal officials, a report of which not infrequently covers as many as 750 pages of paper closely written and almost invariably in the Spanish language or native dialect. In this division there are also received and acted upon reductions and removals of employees of all classes and grades in the classified service; not infrequently the papers in these cases are voluminous, the highest personal interests of the employee are at stake, and just action calls for an expenditure of effort and time which is obvious.

All appropriation acts of the Commission have been drafted in this bureau, and the immense volume of claims, estimates, and correspondence connected therewith has been a part of the preliminary work incident to each act. Upon the enactment of an appropriation bill extracts thereof are at once furnished by this bureau to the several departments, bureaus, and offices interested. Duplicates of estimates and correspondence upon which the act was based are transmitted to the Philippine Commission for its files, and duplicates of claims are furnished the auditor. All requisitions and certificates for public funds are verified, warrants drawn and mailed with letters of transmittal from this bureau. These warrants have ranged in amounts from $300,000 to 2 cents.

Further, this office is required to appoint committees and inspectors to pass upon damaged and lost public property throughout the archipelago, and to review and pass upon reports in these cases. This work corresponds to that incident to the appointment and review of boards of survey, and to a certain extent of inspectors, in army administration.

The files and records received from the office of the secretary to the military governor date from August 23, 1898, ten days after the occupation of the city of Manila, and purport to cover the subsequent period in so far as the action of insular central authority in civil affairs is concerned. There was naturally at all times, and particularly in the earlier period of military government, an unavoidable intermingling of civil and military factors in almost all correspondence and action. In winding up the affairs of the office of the secretary an effort had been made to withdraw records of matters purely military, and all such were turned over to the office of the adjutant-general of the Division of the Philippines as military records prior to the creation of the executive bureau.

The records of the Spanish Government, so far as recovered after the occupation of the city of Manila by United States forces, had been placed in the custody of a force of employees who were carried upon the rolls of the office of the secretary to the military governor, and later by this bureau, until October 21, 1901, when the bureau of archives was created an independent office and its chief assumed the care and control of these public documents.

The record system of the office of the secretary to the military governor was that of card index and file copies, a form of what is currently termed "card record system." This method has been followed to the present time in the executive bureau, and the results are such as to warrant its continuance.

Upon the establishment of the four executive departments (act No. 222, September 6, 1901), it was decided to centralize their records in one office in the interests of both economy and utility, and the executive bureau was made the office of record for those departments.

There have been recorded in the bureau since its establishment 28,880 written communications, and sent out by mail or messenger 31,101 such papers. During the same period there have been received and distributed more than 200,000 printed publications. In addition there have been delivered by the messengers of this bureau several thousand notices of public sessions of the Commission and other official functions.

Since the establishment of the printing plant, requisitions for all public printing required for the insular and provincial governments and the municipality of Manila have passed through the executive bureau for recording after approval by the civil governor or head of executive department prescribed by law. Almost the entire time of an American employee of this office has been taken up in looking after these requisitions, many of which have had to be returned for completion, correction, or revision, such action so far as possible having been taken informally in the interests of expedition. The printing plant commenced operations June 1, 1902, and during the subsequent period covered by this report 1,331 requisitions have been recorded and placed in the hands of the printer within a few hours after receipt almost without exception.

The work required of the employees of this bureau has been hard and without relaxation. There have been frequently recurring urgent demands for great expedition in order that important and bulky correspondence might catch a steamer about to leave for the States. The steady increase in the business of the office has taken up any margin of personnel that seemed about to become available for emergency demands of the service, such as absences on account of sickness, and assistance of other offices whose organization may be pending or incomplete for any reason. A high standard of efficiency has been exacted, and as a result several changes in the personnel of the clerks have occurred.

During the past year the local supply of American clerks has notably decreased both in quantity and quality. Except by importation from the United States it is now practically impossible to secure the services of a competent American clerk, unless by transfer from another bureau or appointment from the Army. While it is undoubtedly true that for some years we must rely upon Americans to fill certain difficult clerical positions, it is believed that most satisfactory results will be secured by the appointment of Filipinos to the lower clerical positions in which individuals will demonstrate capacity for work of a higher character and as their knowledge of the English language and adoption of American methods of thought and work increase, personnel will not be lacking from which to fill vacancies at the most difficult desks. For some months the plan has been followed of filling vacancies above $900 per annum as far as possible by promotion and the appointment of Filipinos only to the resulting vacancies, such appointees being required to possess a fair knowledge of typewriting and the English language, and a good local school education in Spanish, in addition to the usual certificate of the civil-service board. It is not the experience of this office that the Filipino as a class is unwilling to or incapable of work. When given just compensation and treatment he displays industry and capacity which are most creditable; if accorded the same treatment as the American employee he quickly recognizes the fact and shows a disposition to enter into competition, apparently as willing as the Caucasian to work for results flowing from individual merit if he feels he suffers no racial handicap. There is no reason to doubt that adequate salaries and fair treatment will secure for the government of the Philippine Islands a competent force of native employees of all grades within a few years.

Collectively and individually the clerks and messengers of the executive bureau have exhibited most commendable industry in the performance of their several duties, to which they have brought a disposition of well-disciplined, original thought that has enabled each in his respective sphere to perform his whole duty. It would be manifestly unfair to commend any particular individuals unless it were the stenographers, who have worked cheerfully without exception Saturday afternoons and every evening until after 6 o'clock, often until 7 or later, and the men assigned to the record division, who have not only done a vast amount of work exceptionally well, but, month after month, without prospect of relief, have kept at the most tiresome drudgery comprised within the work of an office.

It is believed that during the ensuing year this bureau will be able in a greater degree than heretofore to relieve the civil governor and the heads of the four executive departments from the volume of detailed administrative work, thus allowing these officials more opportunity for the expedition of weighty matters—legislative and executive—arising in their dual offices.

Very respectfully,

Beekman Winthrop,
Acting Executive Secretary.

EXHIBIT B.

REPORT OF THE GOVERNOR OF THE PROVINCE OF RIZAL.

PROVINCE OF RIZAL, OFFICE OF THE GOVERNOR,
Pasig, Rizal, P. I., December 31, 1901.

This province has been formed with the 19 pueblos of the province of Manila, outside of Manila, and the 14 pueblos of the political-military district of Morong; the name of Rizal was chosen by the inhabitants in honor of the great Filipino patriot, Dr. José Rizal.

It is situated in the central part of Luzon and its limits are: North, the province of Bulacan; east, the Infanta district; south, the province of Cavite, and west, the bay of Manila; its surface covers 170,459 hectares.

According to the Spanish Official Guide for 1898, the population of the province of Manila and of the district of Morong was 447,178; but Manila is left out, and in consequence of the war, the population of Rizal is only 142,180, according to the census which has just been made, distributed as follows:

Pueblos.	Class.	Population.	Pueblos.	Class.	Population.
Pasig	3	9,644	Taguig	4	6,397
San Pedro Macati	4	1,796	Muntinlupa	4	3,504
Santa Ana	4	2,448	Cainta	4	2,008
San Felipe Nery	4	4,106	Taytay	4	6,172
San Juan del Monte	4	1,088	Antipolo	4	2,903
Novaliches	4	1,601	Teresa	4	1,747
Caloocan	4	6,512	Bosebose	4	483
Tambobong	2	18,639	Angone	4	2,285
Navotas	3	10,200	Binangonan	3	9,910
Malibay	4	1,672	Cardona	4	2,604
Pasay	4	5,792	Morong	4	4,989
Paranaque	4	6,274	Baras	4	1,233
Laspiñas	4	2,374	Tanay	4	3,771
Mariquina	4	7,163	Pililla	4	2,033
San Mateo	4	4,153	Quisao	4	456
Montalvan	4	3,018	Jalajala	4	1,362
Pateros	4	3,816			

Outside of this population one must count the hill tribes and the mountain tribes. The first live nearer to the towns and the last named farther from them; they are nomad tribes and live in the great mountainous region which extends as far as the Pacific Ocean. Some of these tribes are to be found in the neighborhood of Montalvan, Bodoboso, and Tanay; but it has been impossible to calculate even approximately the number of people which belong to each of them.

The policy of attraction which has been formerly used with them seems to show that these tribes are not entirely refractory to civilized life, but I believe that the worthy secretary of the interior, who, with exquisite tact, is trying to bring together in a barrio the mountain dwellers who live in the neighborhood of Bosoboso, will obtain good results.

LIMITS OF JURISDICTION.

It would be good to fix one for all the limits of the town of Manila, so that the boundaries of the province of Rizal, on the Manila side, may be exactly established. The provisional conditions which exist at present cause a prejudice to the administration.

The assessment operations which are being carried on show that in many places the dividing line is doubtful and insufficiently marked, and the municipal records from which information might have been gathered have disappeared. I have just ordered a general survey to be made; the limits will be established once for all, with the agreement of the municipalities interested in each case, and a plan of each pueblo made out, which will be used later on for a complete plan of the province.

PROVINCIAL GOVERNMENT.

The government and the provincial board were organized in Pasig on June 20, 1901. As there are no public buildings in the town, all the provincial offices are established in private houses, the total monthly rent amounting to $72.50 gold. The provincial government, even in the present period of organization, works with perfect regularity.

MUNICIPAL GOVERNMENTS.

From June to September, 1901, I organized in the province 29 municipalities; to these must be added 4 which had been organized under General Order 40—Pateros, Taguig, Taytay, and Binangonan—which makes in all 33 municipalities. As many of the pueblos which were organized under the Spanish domination have a very small number of inhabitants, I suggested that it would be better for them to be incorporated to others, so as to form large pueblos, which would get along easier, but they preferred to have their own municipal organization, even if the officials had to give up their salaries.

COURTS.

The court of first instance was established on July 11, 1901. Since October last the justices of the peace are being appointed in the pueblos. The list is not quite completed yet, as the pueblos of Morong, Cardona, and Quisao have not yet sent their list of persons eligible for the office of justice of the peace.

II.—ADMINISTRATION.

MUNICIPAL AUTONOMY.

The exercise of municipal autonomy is passing the difficult stage of apprenticeship yet a good deal of circumspection can be observed in general among those who have been the first to be elected by the votes of the people. The people have been greatly satisfied when the communal labor tax, the tithes, and other abuses of the former régime were abolished; and this satisfaction, which is the basis of moral peace, will undoubtedly be greater and more complete when the benefits of the civil régime are themselves more complete.

MUNICIPAL CODE.

I have paid the most scrupulous attention to the observance of this law and have attended in practice its relations with the provincial law. The municipal attributions embrace nearly everything. Their ordinances and regulations do not require any approval or sanction from superior authorities, not even that which might give a relative uniformity to the conditions and the requirements of civil life in the different pueblos. The obligation for the governor to inspect the municipalities does not give him the right to suspend the execution of any municipal resolution; neither does that right belong to the provincial board.

The executive chief of a pueblo can suspend a municipal official or employee (art. 18, i, of the municipal code). The executive chief of the province can also suspend a municipal official, and must report the matter to the civil commission, giving his reasons therefor. In regard to the judicial attributions of the municipal president, article 39 (dd) establishes the right of appeal before the court of first instance, so that according to the case the municipal attributions are in close relation with those of the civil commission or of the court of first instance. The governor and the provincial board have absolutely no right to interfere with them.

It is probably in consequence of this fact that certain municipalities have thought that they were their own masters to the extent of neglecting the social betterment of the people of their pueblos. In regard to gambling, for instance, which is so deeply rooted in the Filipino people, I have tried to reduce it to reasonable limits by ordering the strict observance of the ruling legislation in the matter, but certain municipalities, luckily few in number, are of a different opinion, under the pretense that permits to run forbidden games constitute a source of revenue for the municipal treasury, and that they can use their own discretion in the matter. A petition of the municipality of Tambobong on the subject is now before the civil commission. When a municipal president has requested a few days of absence for justified motives, I have allowed myself to grant it; it would be good to specify who has authority to do so.

PUBLIC FUNDS.

Their administration is generally carried out with the strictest respect for the provisions of the law, although said funds are extremely low, the new economic régime being in its period of organization. The provincial treasurer, whose balance sheet was short in July and August, has closed the year's accounts with a balance in favor of the province of $3,132 gold, after paying the share to the municipalities.

LAND TAX.

The work of assessing the property is well under way, and the ad valorem tax will be collected without difficulty.

III.—Public Works.

GENERAL CONDITION OF THE ROADS.

The former system for repairing and preserving the roads was very defective, and to this is due the poor condition of the roads, especially during and after the rainy season. The lack of funds in the provincial and municipal treasuries has not allowed the undertaking of improvements, but only the slight repairing which was indispensable to allow the roads to be used. The supervisor is now repairing the road from Pasig to San Pedro Macati.

GOVERNMENT BUILDING.

Such a building is really necessary in order to have suitable room for the offices and to avoid the payment of rent. The provincial board intends authorizing the work at the first opportunity.

NEW ROADS.

The meeting of the municipal presidents suggested to the provincial board the convenience of opening three new roads—one between this capital and the pueblos of the southwest, one between same and the pueblos of the northwest, and one from Antipolo to Angone. The provincial board considers these three roads very useful, and I will do my best to have them built as soon as possible.

CANAL TO LAKE LAGUNA DE BAY.

The meetings of the presidents also asked that a new canal opening on the Laguna de Bay, by Paranaque, be studied, so as to avoid the inundations in the pueblos situated on the shore of the Laguna. Such a work deserves special study and shall be attended to when the time comes.

REMARKS.

As a consequence of the war, very few pueblos have public buildings for city halls and schools. The construction of these buildings and the improvements of the means of communication are desired by all the inhabitants, and it is a pity that this work should have to follow the slow progress of the increase of the public funds.

IV.—Public Buildings.

SCHOOLS.

The province of Rizal only has primary municipal schools; it has no high schools, but Manila is so near that this necessity is easily remedied.

REMARKS.

The system of having in the schools American and Filipino teachers is a good one, but as the latter draw their salaries from the municipal funds they have suffered the consequences of the scarcity of said funds. The establishment of the land tax will do away with this difficulty, and it will be possible then to raise salaries of the Filipino teachers, which are in general so reduced.

V.—Public Order.

PEACE.

Is complete in the province of Rizal, and I have made every effort to have it as strong morally as materially. The inhabitants are decided partisans of the civil government and of American sovereignty.

BANDITISM.

Banditism has always been the natural consequence of war, and certain pueblos of the district of Morong have at all times been the theater of the barbarity of the outlaws; however, although the circumstances and the antecedents were so unfavorable, order and tranquillity have been established in the province without using force by simply appealing to the manliness of the inhabitants, and will be settled once for all if a little help is given. The only things required now are arms for the municipal police and a steam launch, which, outside of the service of the province, would be used for watching Laguna de Bay.

FRIARS.

What has greatly contributed to establish tranquillity in the province is the fact that, perhaps by mere luck, the friars have never tried to come back; and if it were possible to get estates out of their hands, according to the project of the civil commission, an Octavian state of peace would be enjoyed in the province of Rizal.

VI.—Agriculture, Industry, and Commerce.

AGRICULTURE.

This is the principal source of wealth in the Philippines, but in general it has never been prosperous, on account of the lack of capital and of old-fashioned customs, which have prevented modern appliances from being introduced. To-day agriculture has still further declined on account of the consequences of the war and the losses of cattle caused by the rinderpest; and the province has furthermore suffered from the periodical inundations of the pueblos of the lake shore and of some of the towns in the interior, and also from the locust plague, not long ago, but the fertility of the soil and the industry of the inhabitants have partly averted the harm, and the rice crop, which is being gathered, is sufficient to keep hunger away.

A remedy supplied by the superintendent of government laboratories is being tried for the destruction of the locust, and I have prepared a statement of the losses caused by the rinderpest in each pueblo, which will be submitted to the provincial board of health about to be organized.

INDUSTRY AND COMMERCE.

These branches do not amount to much in the province of Rizal, as in general they are only practiced on a small scale. However, the spirit of association is awakening, and it can be believed that, when peace is firmly established in all of the archipelago, civil régime and the good dispositions of the people of the province will give it further progress and prosperity.

A. Flores,
Governor Province of Rizal, Philippine Islands.

[Note.—The reports of the governors of the other provinces of the archipelago are not reprinted in the present report because they have already been published and may be found in Senate Document No. 331, Fifty-seventh Congress, first session.]

EXHIBIT C.

CIVIL SERVICE BOARD.

PHILIPPINE CIVIL SERVICE BOARD,
Manila, October 14, 1902.

The honorable the CIVIL GOVERNOR, *Manila, P. I.*

SIR: The board has the honor to submit its second annual report, covering the period from October 1, 1901, to October 1, 1902, showing its proceedings and the practical effect of the operation of the law, and the rules and regulations adopted, reviewing the extensions of the classified service, and offering suggestions and recommendations for carrying out more effectually the purposes of the civil-service act.

It was believed that after the completion of the organization of government bureaus in 1901, and the consequent examinations necessary to fill vacancies in those bureaus and to satisfy the provisions of section 22 of the civil-service act, there would be a decrease in the number and kinds of examinations which would be required to be held by the board. The statistics submitted as a part of this report, in Exhibit A, show, however, a decided increase. This increase is accounted for in part by appointments resulting from promotions and in part by the additional appointments resulting from the extension of the civil-service law and rules to the provincial service, to the uniformed police force, to firemen of the fire department of the city of Manila, and to prison guards. It is observed that since October 1, 1901, there have been held 104 different and distinct kinds of examinations, specially prepared, in which 3,929 competitors were assembled and examined. Of these, 2,044 became eligible to certification. Of the total number examined for original entrance to the service, 794 English-speaking competitors passed and 473 failed, and 916 Spanish-speaking competitors passed and 1,156 failed. Of the total number examined for promotion and transfer in the service, 200 English-speaking competitors passed and 142 failed, and 134 Spanish-speaking competitors passed and 114 failed. In Exhibit B it is shown that 321 appointments were made on noncompetitive, non-educational examinations, thus making a total of 4,250 persons examined during the year.

Of the total number of original appointments made as a result of examinations prepared and held in the Philippine Islands, 726 were selected from registers of English-speaking eligibles and 668 from registers of Spanish-speaking eligibles. Seven hundred and seventy-two appointments were made by promotion and 150 by transfer. Not all of the appointees by promotion or by transfer were required to be examined, as the examination status previously obtained sufficed. Many of the appointments made by promotion or by transfer to higher classes and grades required the preparation of special examinations of a technical and scientific character, as shown in Exhibit A. The totals of such appointments are given in Exhibit B, but the positions are not enumerated.

About 2,000 appointments were made during the twelve months ended October 1, 1902, as a result of examinations held in the Philippine Islands by this board.

Including those appointments made by promotion and transfer where the examination status did not require further examination, and those made by reinstatement and reduction, 2,500 appointments, in round numbers, have received the attestation of this board during the year covered by this report. This number does not include the employment of native unskilled laborers, no examination being practicable for this class of employees and no formal appointments being made.

As an illustration of the board's activity and efforts to avoid embarrassment by its promptness, three separate examinations were given within a week, in which 82 employees were examined for promotion in one office and the results reported to the chief of the bureau on the day following the examinations. By observing the principle of anticipating and meeting demands promptly, embarrassing conditions have been avoided. To accomplish this, the board and its examiners have not regarded usual office hours. The office has been open from 8 a. m. to 6 or 7 p. m. nearly every day of the year. The board takes this opportunity to commend the zeal and ability with which the examiners and other employees of this office have performed their duties.

A considerable progress has been made along the line of promotion examinations, as shown by the results mentioned in this report. Much remains to be done to perfect this most important and difficult feature of the work of the board. Opposition to promotion examinations on the part of heads of offices will render difficult the establishment and retard the development of a system of promotion examinations. On the other hand, hearty and disinterested cooperation will lighten the task of the board and aid in securing most satisfactory results.

APPOINTMENTS MADE IN THE UNITED STATES.

The law provides that preference in appointment shall be given first to "natives of the Philippine Islands," and second to "all honorably discharged soldiers, sailors, and marines of the United States." This preference is being observed whenever applicants of these classes are found upon examination to possess the necessary qualifications to fill vacancies.

To fill some of the special technical, scientific, or professional positions, it has been found necessary to make appointments in the United States by transfer from the United States classified civil service or as a result of examination. Since the passage of the civil-service act on September 19, 1900, 249 persons have been selected in the United States for appointment to such positions in this service. The majority of these appointees were transferred from the United States classified civil service. The remainder, except those selected for judges and heads or assistant heads of bureaus, were appointed as a result of examinations held by the United States Civil Service Commission at the request of this board.

When eligible registers were established, as a result of examinations held in the United States, it was expected that the heads of offices would select from these registers, and that appointments would be made by cablegram of the selections made, but the board soon became convinced that great embarrassment would result to the service if eligibles were not sent for until actually selected by the bureau officers here. The board, therefore, has requested the transmission of cablegrams from time to time, as the conditions and needs of the service warranted, selecting a number of eligibles at a time, so that nearly every transport has brought a few appointees, as they were needed, to fill positions for which not enough competent persons could be obtained here, such as accountants, translators, stenographers, civil and mechanical engineers, etc., nearly all at a uniform entrance salary of $1,200 per annum. The necessity and wisdom of thus anticipating the needs of the service is apparent when it is remembered that several weeks—and generally months—elapse before an appointee actually reports in the islands for duty after the initial steps are taken to secure his services. The board is able to report that the needs of the service have been so carefully approximated that all appointees thus selected have been promptly absorbed into the service upon their arrival, and that this method of procedure has saved the service from serious embarrassment.

METHODS OF EXAMINATION WHICH TEND TO RENDER ELIGIBLES ON GENERAL REGISTERS AVAILABLE FOR SPECIAL WORK, THUS REDUCING THE NUMBER OF TEMPORARY APPOINTMENTS.

The department assistant, and the first, second, and third grade examination provide general bases for further examination. They give tests of general education and intelligence on which to build evidence of special qualifications. The board, by keeping a systematic record, endeavors to ascertain the special qualifications of competitors who become eligible on the general registers, so that when a requisition is received for the certification of names of those having such special qualifications, the resources of the registers may be available at once. There is a constant endeavor to put the right man in the right place and to utilize to the best advantage available eligibles. The utilization of the registers to the fullest extent reduces the number of temporary appointments.

It frequently happens that a certification does not contain the full complement of names, that is, three, but as a general rule the appointing officer selects for appointment if there be but one name, showing both a disposition on the part of the appointing officers not to evade or to avoid the regular method and their confidence in the sufficiency of the board's test of fitness.

By these economic measures of using the department assistant and the grade examinations as bases to test general education and intelligence and by securing evidence of technical, scientific, or professional qualifications by the addition of special subjects, the applicant and the service profit.

EXTENSIONS OF THE CLASSIFIED SERVICE.

Since the submission of the board's last report, the operation of the civil-service law has been extended, bringing into the classified service more than 2,000 positions.

Since March 1, 1902, as provided in the provincial government act, act No. 83, amended by act No. 13[illegible], appointments to all positions except that of governor, which position is elective, and that of fiscal, have been made through examination and certification by this board. Examinations have been held in nearly all of the provinces, and in many of them registers of eligibles have been obtained. The board has organized permanent examining committees in 36 provinces and has given definite instructions in the matter of conducting examinations. The examination papers are prepared by the board in Manila and are rated on their return from the provinces and the eligible registers prepared from which appointments are made. Applicants for positions in courts of first instance and for insular positions, as well as for provincial positions, are examined by these committees, both for original appointment and for promotion. The utmost care is taken to preserve the integrity of examinations. Examiners from this office visit the provinces at intervals for the purpose of conducting examinations and instructing the local committees.

Paragraph *c*, section 6, of the civil-service act, authorized the board to adopt a rule providing for the selection by examination of the members of the police force and of the fire department of the city of Manila and of guards at prisons and penitentiaries. The board adopted a rule, which was approved by the acting civil governor, providing that on and after March 1, 1902, appointments to the above-named positions be made as a result of competitive examination. Since that time all appointments to these positions have been made as a result of competitive examination, and in accordance with the provisions of the law and rules, and the regulations adopted governing promotions. The number of positions thus classified is about 1,000.

On March 11, 1902, the Philippine Commission passed act No. 378, extending the provisions of the civil-service act to the office of the attorney-general. The extension referred to is provided in the following paragraph, viz:

"(*e*) All appointments to positions in the office of the attorney-general, except to positions to which appointment is made by the civil governor with the advice and consent of the Commission, shall be made by the attorney-general in accordance with the provisions of the civil-service act. Employés now in the office of the attorney-general whose positions may be classified by the operation of this act shall continue in the service and discharge the duties assigned them, subject, however, to the conditions contained in section 22 of act No. 5, entitled, 'The civil service act.'"

This act of the Commission practically completed the classification of the Philippine civil service, except the position of teacher, so that at this time no office or bureau is wholly exempt from the provisions of the civil-service act.

Act No. 306, enacted November 29, 1901, amended sections 5 and 20 of the civil-service act and provided for further extensions of the civil-service law. It will be observed by the provisions of paragraph *u*, section 5 of the civil-service act, that all bureaus organized after July 16, 1901, are classified subject to the operations and limitations of the acts organizing such bureaus. The revised Manual of Information Relative to the Philippine Civil Service enumerates under Schedule D the positions at present excepted from examination requirements by the terms of section 20 of the act as amended. It is provided, however, that after October 26, 1902, those positions shall be filled by promotions without examination. The provision for filling the higher bureau positions by promotion is an important and distinguishing feature of the Philippine civil-service act. The Federal civil-service law has no provision comparable with this which invites and induces young men with excellent ability and training to enter the lower grades. It is an exemplification of the merit system. It means a civil personnel above mediocrity and the establishing and the maintaining of an efficient civil-service in the Philippines. During the year covered by this report, the board, recognizing the importance of the law, has constantly endeavored, by adhering to the standards for entrance, to bring into the service well-trained men with more than average capacity. It is important that this provision be kept in view in making future appointments.

Under the provisions of section 21 of the civil-service act—Schedule E of the Manual—vacancies occurring in the positions of cashier of the collector of customs for the islands, captain of the port at Manila, collector of customs at Iloilo, and collector of customs at Cebú are now and have been since April 26, 1902, required to be filled by promotion by competitive examination.

Schedule F, page 7 of the revised Manual, shows the positions not subject to examination and certification by the board, as provided in section 20 of the civil-service act as amended.

A uniform rule recently adopted contemplates that all appointments in the United States, by transfer as well as original, shall be made under the provisions of act No. 80, which provides for the payment of half salary during the voyage from San Francisco to Manila and full salary from the time of arrival in the islands, with reimbursement for traveling expenses to San Francisco after six months of service. This equitable measure will avoid considerable dissatisfaction and discrimination heretofore made in favor of teachers and others on account of payment of full salary and expenses from date of starting from place of residence for Manila. The provisions of this act are extended, by amendment of August 30, 1902, to heads of bureaus and provincial officers not previously embraced therein, in computing their leaves of absence, which may be granted in accordance with the schedule in section 2 of act No. 80.

The board became convinced some months since that the sick-leave privilege, as provided in section 3 of this act, was being abused. An outline of a method of procedure, including the views of the auditor and of the board, was approved by the acting civil governor and was observed pending the consideration of the matter in an executive order which had been previously recommended by the board. Medical certificates are required as evidence of illness claimed, as a matter of necessity to insure the equitable observance of the law. Executive order No. 89 provides definite modes of procedure and proper regulations governing the granting of leave with or without pay and sick leave.

The board has submitted a draft of an amendment to act No. 25, which provides that all appointments to and removals from subordinate positions in those offices or bureaus over which the secretaries of departments exercise executive control shall be approved by the respective secretaries of departments, and appointments to and removals from subordinate positions in all other offices or bureaus in the Philippine civil service, central, municipal of Manila, and provincial, shall be made subject to the approval of the civil governor. By this amendment unskilled laborers may be employed and discharged by heads of bureaus without the approval of the secretaries or of the civil governor. Bureau officers are required by executive order No. 21 to forward all appointments through the civil service board for attestation to the executive office for approval. Executive order No. 84 requires that all removals after probationary service made by bureau officers shall be forwarded through the civil service board, for review and recommendation, to the civil governor for final action. These orders, therefore, define the methods of procedure in making appointments to and removals from the Philippine civil service as authorized in act No. 25.

Act No. 392, passed April 18, 1902, provides that appointments in the service may be made at salaries lower than appropriated for whenever an appointing officer so desires, subject to the approval of the civil service board. The provisions of this act give elasticity in the matter of appointments, permitting the head of an office to handle his office force most conveniently and equitably and at the same time most economically. Prior to the passage of this act it was necessary to pay the full salary of a position whether or not a person with proper and corresponding qualifications could be found to fill it. Forced promotions from class to class, heretofore made to provide vacancies in the lower grades which the needs of the service require to be filled, can not now be made until promotion requirements are satisfied.

ENFORCEMENT OF THE CIVIL-SERVICE LAW AND RULES.

There have been during the last year few violations of the law and rules. The application of the provisions of section 12 of the civil-service act has been necessary in a few cases only. The operation of the law renders attempts in this direction abortive where it does not act as a deterrent. The provisions of section 13 of the civil-service act do not appear to cover certain fraudulent acts against which it is desirable to protect the service, provision for which is made in section 5 of the Federal civil-service act. It is the purpose of the board to submit in the near future a definite recommendation in the matter of needed changes in the law and rules.

While there has been little difficulty in enforcing the civil-service law, there has not always been hearty cooperation in the observance of its provisions. The law contemplates cooperation on the part of officers, a lack of which is invariably detrimental to the interests of the service. When heads of bureaus fully realize that it is incumbent upon them to assist in all proper ways in carrying into effect the law and the rules, less disappointment and embarrassment will result in the matter of selection and appointment, and the highest success will be obtained in the matter of efficiency in the service.

APPOINTMENT OF ELIGIBLES TO COMMERCIAL POSITIONS.

As evidence of confidence of the business men in the adequacy of the tests of fitness given by the board, it is worthy of note that business houses are selecting employees on the certificates of eligibility given by this board. The reasonable and practical requirements of the board appeal to the business men, as they furnish ample evidence of fitness. These certificates have apparently more value in securing business positions than diplomas from educational institutions.

UNCLASSIFIED SERVICE.

The board is advised that it is the intention of the Philippine Commission to place the teaching service under the operations of the civil service law. Such action will probably enable the United States Civil Service Commission to announce examinations in the United States in its "spring schedule" for March and April, 1903.

The position of teacher is one for which the examination method of selection is appropriate above all others. There is no position in the public service for which an adequate examination is so easily adapted. The written examination method of testing the fitness of teachers prevailed in the United States long before the inauguration of examinations for the civil service. It is rare, indeed, that a teacher in the public schools of the United States is permitted to teach without undergoing an examination. For appointment to a position in the schools under the Federal Government control such examinations are competitive. The extension of the merit system to cover this class of positions in the United States has materially raised the standard of efficiency and has resulted in marked improvement in the Federal teaching service. It is believed that experience has demonstrated the necessity and expediency of placing the position of teacher in the Philippine Islands within the classified service.

TENURE OF OFFICE AND STABILITY IN THE SERVICE.

The tenure of office in the Philippine civil service depends principally upon the ability of the appointee to perform the duties required of him satisfactorily. If an employee is inefficient he is not and should not be retained in the service. A stable service depends somewhat upon the nature of the tenure of office and somewhat upon the prospects of meritorious service being recognized. The expressed purpose of civil-service law is to fill the higher positions by persons already in the service who are competent and eligible. It is believed that there is less restlessness and discontent than there was a year ago, which is due partly to the fact that more competent men have been entering the service, who are capable of filling the higher positions and who expect to secure them by the meritorious performance of their duties.

It is believed that it will be advantageous both to the home service and to the Philippine civil service if transfers to the United States after a period of service in the islands of from three to five years were permissible. If a definite time were fixed after which such transfers would be allowed, it is thought that increased efficiency and stability in the service would result. Alternating unequal periods of foreign service may be advisable in judicial as well as in other positions.

EDUCATIONAL STATUS OF THE PERSONNEL OF THE SERVICE.

The board hopes to be able to prepare as an appendix to this report data showing the education of each of the officers and employees in the service. It is realized that all education is not received in schools, but it is believed that thorough systematic school-training lays a foundation for fuller development and greater capacity in the service than is possible without such training. Many young men who have completed collegiate courses have entered the service during the past year at moderate salaries and, as may be expected, are reported to be doing excellent work. Well-trained young men constitute a sufficient reserve force from which the needs of the service may be safely met through promotion to the higher grades and most responsible positions.

THE MANUAL OF INFORMATION.

The Manual of Information was received in January, 1902. It contains civil-service regulations and necessary information relating to examinations and appointments, including an outline of the principal examinations held by the board. The Manual is being revised to January 1, 1903, and will be published for use during the coming year. One thousand copies of the Manual for 1902 were forwarded to the United States Civil Service Commission for use in the United States. There have been forwarded also 1,000 copies of the revised application Form No. 2 for the use of applicants in the United States for this service.

OFFICIAL REGISTER OF THE PHILIPPINE CIVIL SERVICE.

The work of preparing the official register for this service will be taken up in time for its completion by January 1, 1903. As it is desired to show a complete and exact roster of officers and employees on January 1, it can not be published prior to that date.

PERSONNEL OF THE BOARD.

On April 14, 1902, Mr. W. L. Pepperman, secretary, and Senor D. Felipe Buencamino, member, of this board, sailed for the United States under leave of absence granted by the Philippine Commission. Mr. Pepperman decided not to return and resigned his position. Senor Buencamino returned to Manila, arriving on August 27.

Very respectfully,

FELIPE BUENCAMINO, *Member.*
W. S. WASHBURN, *Chairman.*

EXHIBIT A.

The following table shows the results of all examinations (noneducational examinations excepted) held by the board from October 1, 1901, to October 1, 1902:

Examinations.	For original appointment.			For promotion or transfer.			Total examined.
	Number passed.	Number failed.	Total examined.	Number passed.	Number failed.	Total examined.	
HELD IN MANILA.							
1. Additional deputy collector, custom-house	1		1				1
2. Agricultural explorer	5	14	19				19
3. Appraiser, custom-house				2		2	2
4. Bacteriologist, assistant	2		2				2
5. Boarding officer, custom-house				3		3	3
6. Bookbinder	3		3				3
6. Encuadernador	1	1	2				2
7. Bookkeeper	16	15	31	2		2	33
7. Tenedor de libros		1	1				1
8. Cashier, treasurer's office				1	1	2	2
9. Chemist, organic	1		1				1
9. Químico				1		1	1
10. City assessor and collector					1	1	1
11. Clerk, board of health	3	1	4				4
12. Clerk of court	4	1	5		1	1	6
12. Escribano	4	9	13	1		1	14
13. Clerk, first grade	131	110	241	102	112	214	455
13. Primer grado	20	50	70	6	20	26	96
14. Clerk, second grade	192	78	270	2	2	4	274
14. Segundo grado	87	180	267	73	74	147	414
15. Commissary clerk	1		1				1
16. Compositor	12		12				12
16. Cajista		8	8				8
17. Deputy surveyor, custom-house					1	1	1
18. Director of experiment station				1		1	1
18. Dtor. Aux. Estan. Exptn					1	1	1
19. Director of serum institute				1		1	1
20. Draftsman, architectural	1	1	2				2
20. Delineante arquitectónico	2	10	12				12
21. Draftsman, mechanical	3		3				3
21. Delineante mecánico	5	1	6				6
22. Draftsman, topographical	1		1				1
22. Delineante topográfico	21	6	27				27
23. Driver, fire department	27	5	32	2		2	34
24. Electrician, chief	3	2	5				5
25. Electrician, city	4	3	7				7
26. Electrotype finisher	1		1				1
27. Engineer, chief	1		1				1
28. Engineer, chief, fire department	2	1	3				3
29. Engineer, ice plant		3	3	2		2	5
30. Engineer, mechanical	1		1				1

Examinations.	For original appointment.			For promotion or transfer.			Total examined.
	Number passed.	Number failed.	Total examined.	Number passed.	Number failed.	Total examined.	
HELD IN MANILA—continued.							
31. Engineer, sanitary	1		1				1
32. Engineer, steam	5	6	11				11
33. Extra observer, coast and geodetic survey	3		3				3
34. Fiber expert	1		1				1
35. Foreman, general, water and sewer works	1		1				1
36. Foreman, press room	1		1				1
37. Foreman and superintendent of lumber yard	1		1				1
38. Geologist		1	1				1
39. Harbor master				1		1	1
40. Inspector, assistant, forestry	1		1				1
41. Inspector, chief, sanitary	41	17	58				58
41. Jefe inspector sanitario	21	25	46	1		1	47
42. Inspector, medical	13	3	16	1		1	17
43. Inspector, street	1	1	2	1		1	3
43. Inspector de caminos	2		2	1	1	2	4
44. Inspector, timber	1		1				1
45. Interpreter	10	10	20	4	1	5	25
45. Intérprete	6	4	10	3		3	13
46. Interpreter, junior	9	1	10	1	1	2	12
46. Intérprete, auxiliar	13	17	30		2	2	32
47. Laboratory assistant	1		1				1
48. Law clerk	1		1				1
48. Empleado judicial	4	1	5				5
49. Lineman	2		2				2
49. Inspector de hilos eléctricos		2	2				2
50. Mineralogist		1	1				1
51. Pharmacist (dispensing clerk)	9	2	11				11
51. Farmacéutico	2	1	3				3
52. Photo-engraver	1		1				1
52. Fotograbador	2	2	4				4
53. Patrolman, police department	74	26	100				100
53. Policía, police department	84	41	125				125
54. Roundsman, police department				30	6	36	36
54. Cabo, police department				7	4	11	11
55. Sergeant, police department				10	1	11	11
55. Sargento, police department				3	1	4	4
56. Lieutenant, police department				9		9	9
56. Teniente, police department				1		1	1
57. Captain, police department				2	1	3	3
58. Assistant inspector, police department				2	1	3	3
59. Inspector, police department				1		1	1
60. Post-office clerk	42	37	79	2	2	4	83
61. Prison guard, Bilibid	54	26	80	1		1	81
61. Guardia de prisión, Bilibid		4	4				4
62. Property clerk	4	5	9				9
63. Provincipal supervisor (junior civil engineer)	7	4	11				11
63. Ingeniero civil auxiliar		4	4				4
64. Provincial treasurer	5	2	7	1		1	8
65. Special agent, sugar culture	1		1				1
66. Stenographer	7	17	24				24
67. Stereotyper	1		1				1
68. Superintendent, free-delivery post-office				4		4	4
69. Superintendent, money-order post-office				4		4	4
70. Superintendent of pail system	8	1	9				9
71. Superintendent, San Lazaro Hospital	3	4	7				7
72. Superintendente aux. de calles	3		3				3
73. Textile appraiser		1	1	1		1	2
74. Translator	3	12	15	2	2	4	19
74. Traductor	2	8	10	1		1	11
75. Translator, junior		7	7				7
75. Traductor auxiliar	3	6	9				9
76. Typewriter	14	31	45		1	1	46
76. Escribiente á Máquina	1	1	2		1	1	3
77. Veterinary surgeon	2		2				2
78. Apuntador	1	1	2				2
79. Bombero		1	1				1
80. Cajista auxiliar	11	4	15				15
81. Calculista	1	2	3				3
82. Cartero	34	118	152				152
83. Delineante anatómico	7		7				7
84. Delineante auxiliar	5	1	6				6
85. Encuadernador auxiliar	1		1				1
86. Escribano provincial	2		2				2
87. Escribiente á máquina auxiliar	20	26	46				46
88 Faginante	3		3				3
89. Farmacéutico auxiliar	5	11	16				16
90. Inspector de carne		1	1				1

Examinations.	For original appointment.			For promotion or transfer.			Total examined.
	Number passed.	Number failed.	Total examined.	Number passed.	Number failed.	Total examined.	
HELD IN MANILA—continued.							
91. Inspector de edificios, ayudante	2	9	11				11
92. Inspector de mercados	7	23	30	1		1	31
93. Inspector sanitario	54	34	88				88
94. Manguero		1	1				1
95. Médico municipal	2	3	5	2		2	7
96. Mayordomo de hospital	1	1	2				2
97. Montero	46	79	125				125
98. Observador, 1a. clase	4	3	7				7
99. Observador, 2a. clase	11	12	23				23
100. Policia ascenso á 2a. clase				10		10	10
101. Primer enfermero				1		1	1
102. Servicio de correos	2	25	27				27
103. Tercer grado	166	145	311	11	3	14	325
104. Vacunador	8	9	17				17
Total for Manila:							
English	744	448	1,192	195	135	330	1,522
Spanish	676	892	1,568	123	106	229	1,797
	1,420	1,340	2,760	318	241	559	3,319
HELD IN PROVINCES.							
6. Bookkeeper	1		1				1
6. Tenedor de libros		2	2				2
13. Clerk, first grade	23	10	33	5	6	11	44
13. Primer grado	6	27	33	1	1	2	35
14. Clerk, second grade	18	9	27				27
14. Segundo grado	89	113	202	6	4	10	212
16. Compositor	1		1				1
42. Inspector, medical	4		4				4
60. Post-office clerk	1		1				1
63. Provincial supervisor	1		1		1	1	2
66. Stenographer	1	1	2				2
75. Translator, junior		1	1				1
75. Traductor, auxiliar		3	3		1	1	4
76. Typewriter		4	4				4
84. Delineante auxiliar	1		1				1
86. Escribano provincial	1	3	4		1	1	5
87. Escribiente á máquina auxiliar	2	9	11				11
45. Intérprete				1		1	1
46. Interprete auxiliar	1	2	3				3
97. Montero	3	7	10				10
103. Tercer grado	137	96	233	3	1	4	237
74. Traductor		2	2				2
Total for provinces:							
English	50	25	75	5	7	12	87
Spanish	240	264	504	11	8	19	523
	290	289	579	16	15	31	610
Total English	794	473	1,267	200	142	342	1,609
Total Spanish	916	1,156	2,072	134	114	248	2,320
Grand total	1,710	1,629	3,339	334	256	590	3,929

NOTE.—The same figure opposite the titles of the examinations indicates that they are identical, one being in English and the other in Spanish.

EXHIBIT B.

Appointments made in the Philippine civil service upon certification by the civil service board during the year ended October 1, 1902.

COMPETITIVE.

Position.	English-speaking eligibles.	Spanish-speaking eligibles.
Agricultural explorer	1	
Bacteriologist, assistant	2	
Bookbinder	3	
Chemist, organic	1	
Bookkeeper	8	
Clerk of court		4
Clerk, first grade	129	11
Clerk, second grade	174	70
Copyist, third grade		165
Clerk, post-office	44	7
Collector of customs, additional deputy	1	
Collector, natural history	1	
Collector, assistant		1
Compositor	7	
Draftsman, mechanical	3	
Draftsman, junior architectural		2
Draftsman, junior mechanical		2
Draftsman, junior topographical		8
Driver, fire department	16	
Electrician	7	
Engineer, mechanical	10	
Engineer, sanitary	1	
Fiber expert	1	
Foreman, general, water and sewer works	1	
Foreman, press room	1	
Guard, prison	13	
Hospital steward		1
Inspector, building	2	
Inspector of construction	4	
Inspector, medical	4	
Inspector, assistant forestry	1	
Inspector, chief sanitary	20	5
Inspector, sanitary		40
Inspector, street	1	
Inspector, timber	1	
Interpreter	7	6
Interpreter, junior		10
Laboratory assistant	1	
Law clerk	1	2
Letter carrier		12
Lineman	2	
Observer, second class		8
Observer, coast and geodetic survey	3	
Patrolman, first class	53	
Patrolman, third class		65
Pharmacist	6	
Pharmacist, assistant		2
Property clerk	1	
Ranger		82
Sugar specialist	1	
Stenographer	5	
Superintendent of streets, assistant	1	1
Superintendent of lumber yard	1	
Superintendent of pail system	1	
Supervisors (civil engineers)	5	
Translators	2	1
Treasurer, provincial	1	
Typewriters	9	1
Typewriters, junior		8
Veterinarian	1	
Total competitive	558	515

NONCOMPETITIVE.

Baker	1	
Blacksmiths	10	3
Carpenters	9	6
Drivers, fire department[a]	8	2
Engineers, assistant, steam		2
Engineer helper		2
Firemen[a]	5	3

[a] Prior to March 1, 1902, appointments in the fire department and in Bilibid Prison were made on noncompetitive examinations.

Appointments made in the Philippine civil service upon certification by the civil service board during the year ended October 1, 1902—Continued.

NONCOMPETITIVE—Continued.

Position.	English-speaking eligibles.	Spanish-speaking eligibles.
Foremen of laborers	3	....
Foreman of laborers, assistant	1	1
Harness maker	....	1
Market collectors	....	17
Janitors	....	14
Light-house keepers	....	2
Machinists	3	2
Master mechanic	1	....
Mate of launch	1	....
Master of launch	1	1
Matron	....	1
Messengers	2	54
Oilers	8	1
Overseers	6	3
Painter	1	....
Pipe fitter	1	....
Pipemen[a]	....	5
Prison guards[a]	7	2
Prison keeper[a]	....	5
Rodsmen	2	....
Skilled laborers	11	....
Superintendent of corral	1	....
Teamsters	53	21
Truckmen[a]	....	2
Watchmen	32	2
Wheelwright	1	1
Total noncompetitive	168	153
Total competitive	558	515
	726	668

[a] Prior to March 1, 1902, appointments in the fire department and in Bilibid Prison were made on noncompetitive examinations.

Appointments made through changes in the service.

Nature of change.	English-speaking eligibles.	Spanish-speaking eligibles.	Total.
Promotion	518	254	772
Reduction	46	44	90
Transfer	116	34	150
Reinstatement	56	19	75
Total	736	351	1,087
Total competitive	558	515	1,073
Total noncompetitive	168	153	321
Grand total	1,462	1,019	2,481

NOTE.—Many of the appointments made by transfer and promotion to higher classes and grades required the preparation of special examinations of a technical and scientific character, as shown in Exhibit A. The totals of such appointments are given in Exhibit B, but the positions are not enumerated.

NOTE.—The English name of positions, without the Spanish equivalent, is used in this exhibit to avoid needless repetition.

EXHIBIT D.

INSULAR PURCHASING AGENT.

ANNUAL REPORT INSULAR PURCHASING AGENT.

E. G. Shields, insular purchasing agent; M. L. Stewart, assistant insular purchasing agent; Charles Esplin, jr., disbursing officer and cashier; F. H. Garrett, chief division property; S. J. Epperly, chief division records; W. J. Levy, bookkeeper; J. B. Morton, chief clerk.

OFFICE OF THE INSULAR PURCHASING AGENT
FOR THE PHILIPPINE ISLANDS,
Manila, P. I., October 25, 1902.

The EXECUTIVE SECRETARY,
Manila, P. I.

SIR: I have the honor to submit the following report of the administration and business of this bureau for the fiscal year ending June 30, 1902:

The bureau was created by act 146, enacted June 21, 1901. This act appropriated $100,000 for the uses of the bureau. Captain Massie was appointed chief of the bureau, but before he had effected an organization he died suddenly. This left the bureau without a chief until July 26, 1901. When I assumed control I found that the supplies and property purchased from the public civil funds had been invoiced by Captain Slavens to the various military officers and bureaus, leaving this bureau without even stationery for its use and operation. The transfer from military to civil government took place July 4, 1901. The creation of bureaus and establishment of civil control in the city of Manila and the rapid progress in the establishment of provincial governments throughout the archipelago caused demands upon the bureau which we were unable to meet. The market of Manila was exceedingly bare, and prices demanded exorbitant. Business relations were established with China, Japan, and Australia, which relieved the situation somewhat; but the requirements increased and it became necessary to send an agent to the United States to purchase a supply of goods. This was done, and though the order was placed on August 14, 1901, nothing was received until May 23, 1902. This long delay compelled me to go into the open market to supply the demand as far as possible. This was expensive, but there was no alternative. We must go without, or accede to the demands of the Manila merchants.

Act No. 198 provided for the method of furnishing official transportation to the employees of the insular, provincial, and municipal governments of the city of Manila, to and from the city of Manila, from and to the provinces, enacted August 12, was placed under the control of this bureau. This division has steadily grown, until we have now 67 carromatas, 6 quilez, 9 caretellas, 5 spring wagons, 5 trucks, 10 escort wagons, 142 native horses, 25 American horses, and 22 mules.

We have suffered great loss in this division from glanders, surra, and rinderpest. We have lost since the creation of this branch 91 native ponies, 6 mules, and 1 American horse from disease. The supply of native animals is about exhausted and the service is crippled and inefficient.

Transportation by rail and water is supplied on requisition in the same manner as it is handled by the Army.

The rapid increase of business made a reorganization of the bureau necessary. Act No. 254, enacted October 2, increased the force in the clerical department and added the insular printing plant, taken over from the military government. Act No. 264 further increased the clerical force and gave an additional appropriation of $400,000 for the needs of the bureau.

Section 5 of act No. 146 requires that "Each head of a civil department, bureau, or office shall submit semiannually, at the beginning and middle of each fiscal year, to the said purchasing agent, an estimate of articles or supplies which will probably be required for the transaction of its official business for the ensuing six months, such estimates to be used as a basis upon which the purchasing agent may make necessary purchases."

We have experienced some difficulty in getting a compliance therewith. Not having a proper basis for purchases, we have been frequently called upon to supply goods for which no estimate has been made, and are not obtainable, either here or often in the United States, unless manufactured specially. There is another feature which has caused endless trouble and delay—that of heads of bureaus making requisitions indefinite in character, and for supplies of such a character that we are unable to determine what they want. As an evidence of the trouble we have experienced, I submit an extract from a letter from James B. Clow & Sons, of Chicago, one of the largest hardware firms in the United States, bearing on an order forwarded from this bureau directed to them, as we were unable to find any trace of the articles required for:

"My Dear Sir: I have been actually engaged in business for over twenty-six years, and I want to say to you that in that length of time I never saw an order that was as difficult to execute as the one for which we inclose you the papers herewith. Truly and positively we have searched the United States for the goods. We found goods listed that concerns never kept and which they claimed they had never before sold, and some few, they said, had never been made. I want you to believe me when I tell you that we energetically pushed for the goods, and the majority have been here and paid for two months; but there have been so many short that we felt, in consideration for the parties for whom it was intended, it was better to hold here and send the order complete, especially as the people who were the manufacturers of the goods kept promising us that they would make quick deliveries. We finally got the stuff wherewith to complete the order. The papers inclosed herewith tell the story."

THE NEEDS OF THE BUREAU.

There is urgent need for a thoroughly equipped and up-to-date warehouse on the water front, preferably on Magallanes Park. We are paying $2,640 Mexican per month for two warehouses that are wholly inadequate and not fitted for our uses. The want of a proper place, with sufficient wharfage, makes handling of supplies expensive, and delays occur in both shipping and receiving freight.

Our stables or sheds are of a temporary nature, and do not properly house either animals or vehicles. The present location is not a good one, and if it is determined by the Commission not to make a change proper harness rooms should be constructed and the grounds filled in with stone. At the present time there is no building available belonging to the insular government which is fitted in any way to handle so extensive a business as is developed through this bureau.

I also especially recommend the establishment of a machine shop and woodworking plant. The large amount of iron work required, repairs to launches, the machine work necessary, and the supplying of furniture and building material, which is now done by private concerns at exorbitant prices, adds greatly to the expense and operation of the government. The addition of the coast guard and transportation bureau, with its fleet of vessels, will add greatly to the expense of maintenance. The Army have such a plant, which might be taken over by the insular government, if such an arrangement could be effected, and all the work for both civil government and military could be done. I am sure this would be much more economical to both branches of the service if this plan were adopted. The reduction of the transport fleet to one a month will bring about a like result in the number of launches in commission, thereby lessening a demand for so large a plant on the part of the Army. By a small addition thereto of dynamos this plant could easily furnish light and power to the custom-house and other civil buildings in the vicinity.

I have the honor to herewith submit a detailed statement of the business of the bureau from August 1, 1901, to June 30, 1902, and a supplemental condensed statement to September 30, 1902. See Exhibits A and B.

Very respectfully,
(Signed) E. G. Shields,
Insular Purchasing Agent.

Disbursing officer's statement for the fiscal year ending June 30, 1902.

[United States currency.]

RECEIPTS.

From treasurer P. A., sundry warrants	$1,236,038.81
From gain in exchange (lower than Government rates, obtained from local banks on sundry transfers to Washington, New York, and Hongkong)	1,143.765
From sundry refunds	36.31
	1,237,218.885

DISBURSEMENTS.

Purchase of supplies (Manila) (Exhibits B and C)	$838,900.365
Transfers to Washington, D. C., to cover purchases made in United States	200,000.00
Bureau equipment and expense (Exhibits B and C)	72,388.22
Salaries (Exhibit B)	38,896.25
Wages (Exhibit B)	37,569.975
Refunds to treasurer P. A., unexpended balances of appropriations	24,678.155
Losses in value of cash on hand occasioned by variations in the Government rate of exchange	1,351.45
Balance on hand June 30, 1902	23,434.47
	1,237,218.885

I certify that the foregoing is a true and correct statement of the receipts and disbursements of all funds appropriated and made available for the bureau of the insular purchasing agent during the fiscal year ending June 30, 1902.

CHAS. ESPLAN, Jr.,
Disbursing Officer, Bureau of the Insular Purchasing Agent.

EXHIBIT A.—*Summary of receipts and disbursements for the fiscal year ending June 30, 1902.*

1901-2.		Act 146.	Act 181.	Act 229.	Act 264.	Act 311.	Act 330.	Act 389.	Act 415.	Total.
	From whom received.									
Aug. 8	Treasurer, P. A., warrant No. 410	$25,000.00	$5,000.00							$28,000.00
Sept. 21	Treasurer, P. A., warrant No. 564	25,000.00	1,700.00							26,700.00
Sept. 23	Treasurer, P. A., warrant No. 574			$5,028.33						5,028.33
Oct. 15	Treasurer, P. A., warrant No. 626	25,000.00	725.00	825.00						26,550.00
Oct. 22	Treasurer, P. A., warrant No. 662				$150,000.00					150,000.00
Oct. 22	Treasurer, P. A., warrant No. 663				67,946.66					67,946.66
Oct. 28	Treasurer, P. A., warrant No. 705	25,000.00								25,000.00
Nov. 9	Treasurer, P. A., warrant No. 730				57,527.50					57,527.50
Nov. 16	Gain on $5,000 gold transferred to Hongkong	207.835								207.835
Dec. 12	Treasurer, P. A., warrant No. 848	50,000.00			65,870.00	$4,947.00				120,817.00
Dec. 17	Refund of charge, Mariano Uy Chaco				26.25					26.25
Dec. 28	Gain on $10,000 gold transferred to Hongkong	752.685								752.685
Jan. 9	Treasurer, P. A., warrant No. 942	25,000.00			75,000.00					100,000.00
Jan. 17	Treasurer, P. A., warrant No. 964						$19,700.00			19,700.00
Jan. 28	Treasurer, P. A., warrant No. 1048	25,000.00								25,000.00
Jan. 28	Treasurer, P. A., warrant No. 1049				45,000.00					45,000,00
Feb. 27	Treasurer, P. A., warrant No. 1137						16,000.00			16,000.00
Feb. 27	Treasurer, P. A., warrant No. 1144				40,000.00					40,000.00
Feb. 27	Treasurer, P. A., warrant No. 1145	30,000.00								30,000.00
Mar. 13	Gain on $15,228.75 Mexican transferred to Hongkong				135.625					135.625
Mar. 25	Treasurer, P. A., warrant No. 1222				25,000.00					25,000.00
Mar. 25	Treasurer, P. A., warrant No. 1223						13,000.00			13,000.00
Mar. 25	Treasurer, P. A., warrant No. 1224	5,000.00								5,000.00
Mar. 31	Treasurer, P. A., warrant No. 1243	10,000.00								10,000.00
Apr. 10	Gain on $84.50 gold transferred to Hongkong	14.37								14.37
Apr. 15	Gain on $5,000 Mexican transferred to Hongkong				8.29					8.29
Apr. 24	Treasurer, P. A., warrant No. 1329				110,000.00		400.00	$27,456.00		137,856.00
Apr. 24	Treasurer, P. A., warrant No. 1330	25,000.00								25,000.00
May 27	Treasurer, P. A., warrant No. 1480	15,000.00								15,000.00
May 27	Treasurer, P. A., warrant No. 1481	5,947.13			44,052.87					50,000.00
May 27	Treasurer, P. A., warrant No. 1483				50,000.00			9,456.00		59,456.00
June 12	Treasurer, P. A., warrant No. 1553				30,000.00			17,456.00		47,456.00
June 12	Treasurer, P. A., warrant No. 1554	10,000.00								10,000.00
June 24	Refund of charge, E. C. McCullough & Co				10.06					10.06
June 25	Treasurer, P. A., warrant No. 1631								$1.32	1.32
June 25	Treasurer, P. A., warrant No. 1632				30,000.00					30,000.00
June 30	Treasurer, P. A., warrant No. 1650				25,000.00					25,000.00
June 30	Gain on $7,500 Mexican transferred to Hongkong				24.96					24.96
	Total	301,922.02	5,425.00	5,853.33	815,602.215	4,947.00	49,100.00	54,368.00	1.32	1,237,218.885

	For what paid.									
Aug. 31	Disbursements, August	3,597.91	2,011.51							5,609.42
Sept. 30	Disbursements, September	17,544.57	1,389.885	1,325.60						20,260.055
Oct. 12	Disbursements, October 1 to 12	15,769.22	25.00	301.00						16,095.22
Oct. 12	Refund to treasurer, receipt No. 1138	13,088.30	1,273.605	3,401.75						17,763.635
Oct. 31	Disbursements, October 15 to 31	34,112.03	407.67	154.67	46,212.46					80,886.83
Nov. 11	Transfer to disbursing agent, Washington, D. C.				150,000.00					150,000.00
Nov. 30	Disbursements, November	13,664.37	20.00	50.00	61,951.76					75,686.13
Dec. 31	Disbursements, December	46,716.41		200.00	68,056.65	2,861.50				117,834.56
Dec. 31	Refund to treasurer, receipt No. 2328		297.33	420.31	792.42					1,510.08
Jan. 31	Refund to treasurer, receipt No. 2827					2,085.50				2,085.50
Jan. 31	Disbursements, January	51,825.25			105,531.50		11,783.71			169,140.46
Feb. 28	Disbursements, February	27,213.30			32,108.35		13,301.03			72,622.68
Mar. 31	Disbursements, March	13,981.44			47,176.72		12,187.50			73,345.66
Apr. 12	Loss, exchange on local currency balances				756.94		494.175			1,251.115
Apr. 30	Disbursements, April	27,581.28			102,163.24		3,333.625	11,269.17		144,347.315
May 28	Transfer to disbursing agent, Washington, D. C.	5,947.13			44,052.87					50,000.00
May 31	Refund to treasurer, receipt No. 4709						1,506.07			1,506.07
May 31	Disbursements, May	6,498.41			69,808.34		273.11	11,791.16		88,371.02
June 30	Disbursements, June	24,273.77			63,665.125		5,879.59	28,701.055	1.32	122,520.86
July 7	Loss, exchange on local currency balances						11.61	88,725		100.335
July 25	Disbursements, June, supplemental							1,034.60		1,034.60
July 25	Refund to treasurer, receipt No. 5626						329.58	1,483,29		1,812.87
	By balance	108.63			23,325.84					23,434.47
	Total	301,922.02	5,425.00	5,853.33	815,602.215	4,947.00	49,100.00	54,368.00	1.32	1,237,218.885

EXHIBIT B.

Statement of purchases paid for and bureau equipment and expense for the fiscal year 1902.

[United States currency.]

PURCHASE OF SUPPLIES.

Coal	$119, 567. 67	
Lumber	91, 612. 78	
Printing	67, 012. 03	
Stationery	29, 619. 725	
Office furniture and supplies	28, 855. 155	
Typewriters	22, 729. 075	
Safes	5, 323. 32	
Animals, American	43, 670. 00	
Animals, native	2, 511. 34	
Forage	47, 983. 41	
Vehicles	13, 628. 09	
Harness	9, 655. 97	
Paints and oils	19, 135. 94	
Cement and lime	16, 511. 175	
Freight	7, 668. 57	
Uniforms, materials and trimmings	37, 037. 11	
Commissary supplies	45, 442. 985	
Medical supplies	7, 731. 415	
Miscellaneous supplies	223, 204. 605	
		$838, 900. 365

BUREAU EQUIPMENT AND EXPENSE.

Animals	16, 387. 02	
Forage	15, 845. 385	
Vehicles	12, 117. 13	
Harness	3, 718. 66	
Repairs to transportation	1, 767. 31	
Miscellaneous supplies, rents, etc	22, 552. 715	
		72, 388. 22

SALARIES AND WAGES.

Salaries (including all skilled and classified labor in transportation department, warehouses, shipping offices, and general office)	38, 896. 25	
Wages (day labor)	37, 569. 975	
		76, 466. 225
Total disbursements		987, 754. 81

Detailed statement of disbursements during the fiscal year ending June 30, 1902, showing to whom (individuals or firms) and for what purpose payments have been made.

	Bureau equipment and expenses.	Purchase of supplies.
Subsistence department, U. S. Army		$25, 505. 44
Quartermaster's department, U. S. Army		68, 277. 29
Erlanger & Galinger		12, 957. 95
Cull & Maddy	$55. 00	461. 70
American Commercial Company, Limited		707. 35
Henry D. Woolfe		9, 660. 40
Cameron & McLaughlin		2, 695. 61
Pedro P. Roxas	600. 00	54. 64
Chofre & Co		7, 840. 515
E. C. McCullough & Co		83, 591. 21
Jno. T. Pickett		2, 888. 165
Rosario V. R. de Penalosa	2, 037. 655	1, 373. 31
Bazar de Velasco		17, 970. 25
Henry D. Musser & Co	81. 50	2, 027. 505
Angel Ortiz		7, 061. 005
A. Grossmann	25. 56	2, 294. 64
North American Trading Company		96. 855

Detailed statement of disbursements during the fiscal year ending June 30, 1902, showing to whom (individuals or firms) and for what purpose payments have been made—Cont'd.

	Bureau equipment and expenses.	Purchase of supplies.
A. S. Watson & Co., Limited		$511.985
Mariano Uy Chaco	$8.00	28,700.375
Warlomont Hermanos		2,934.045
Pacific Oriental Trading Company		12,539.735
American Drug Company		2,386.81
Standard Oil Company, of New York		3,516.77
Chas. N. Ferrier	183.81	2,391.50
Castle Bros., Wolfe & Sons		34,344.165
California Lumber Company		622.20
C. E. La Munyon		613.36
Behn, Meyer & Co		2,553.04
Jose de Garchitorina	4,403.11	1,312.73
Tuason y Sampedro	25.37	832.84
Insular Cold Storage and Ice Plant	16.60	1,257.30
Macondray & Van Buskirk		23,423.93
San Nicholas Iron Works, Limited		2,262.735
E. G. Shields, insular purchasing agent	38,775.38	
Shewan, Tomes & Co., Hongkong		10,807.72
W. T. Nolting, postmaster	7.00	151.00
Enrique Spitz		779.925
Manuel Arias Rodriguez		70.00
Albert Bryan		1,484.21
Fred Wilson		776.25
Manuel Earnshaw & Co		6,195.91
Smith, Bell & Co		638.43
Pioneer Saw Milling and Lumber Company		4.16
J. D. Murray		242.50
Medical department, U. S. Army		5,054.16
Viuda de I. Bota		186.95
Jose M. á Bren		100.15
American Bazar		1,172.53
C. Defer		2,557.90
Struckmann & Co		8,137.37
Dorr & Co		185.75
Union Truck Company		107.93
Newhall & Fenner		1,399.74
Ricardo Flores	3,880.00	
Adolfo Roensch y Ca		13,662.40
Tobias Wright		518.00
Ramos y Ca		439.07
Gregorio Peñalosa		70.08
Donaldson, Sim & Co		583.21
Sociedad de Talofonso		85.00
M. Fuster & Co		1,268.59
Libraria de Coloń		146.72
J. W. Karsten		673.00
Elias D. Marcaida (& Co.)		1,589.82
Isidro Salvador	62.50	
Manuel Ygnacio	62.50	
Warner Barnes & Co., Limited		6,911.25
W. D. Latimer		2,307.67
Dy Chiaco		600.62
H. G. Lamson		85.00
Compañia Maritima Steamship Company		54,438.63
Adolfo Richter & Co		4,480.00
Henry W. Peabody & Co		80,109.655
Philippine Trading Company, Limited		303.09
Froelich & Kuttner		23.20
Philippine Lumber and Development Company		9,251.39
Holliday, Wise & Co		3,455.395
C. M. Guertin	125.00	
Lizarraga Hermanos		800.00
M. Tagawa & Co		654.02
W. S. Bailey & Co., Hongkong		10,306.96
Compañia General de Tobacos de Filipinas		165.28
Felix Ullman & Co		4.50
C. Alkan		1,197.48
John R. Edgar (Company)		305.875
Luis Yangco	3,887.14	131.09
Payot, Upham & Co., San Francisco		1,082.41
B. W. Cadwallader & Co		1,258.055
American Hardware and Plumbing Company		2,787.195
Gomez y Ca	11.36	
Viuda y Sucesora de Zobel		200.795
Ynchausti y Ca		10,375.81
Vacuum Oil Company		219.21
Bureau of Public Printing		937.91
Jardine, Matheson & Co., Hongkong		93.75
Ong Chopun		13.75
Tan Tayco		266.375

Detailed statement of disbursements during the fiscal year ending June 30, 1902, showing to whom (individuals or firms) and for what purpose payments have been made—Cont'd.

	Bureau equipment and expenses.	Purchase of supplies.
Francisco Dyfico	$15.00	$232.84
Pohomull Brothers		10.00
Ramon Ongpin		44.01
Lorencio Martinez		35.00
Sy Jole		235.37
Nam Shing		7.00
Kong Mow Chow		82.39
Ysidro Espejo		62.50
Pedro Maligalig		62.50
Pedro Mia		125.00
N. D. Levin	235.00	735.00
W. B. Walker		14.00
Jacinto Villanueva		359.00
Faustino Dugue		40.00
Ygnacio Ama		55.00
Geronimo Canda		13.00
Aurelio del Carmen		67.50
G. del Carmen		47.50
Peter F. Barling		70.00
E. M. Barton		423.00
J. Alemara		19.00
C. S. Lndlow		40.00
Moreno & Co	1,295.50	
José M. T. Reyes	130.50	
O. P. Bernhoft	21.00	
B. E. Laer		2.50
Antonio Conni		75.00
W. D. McKinnon		150.00
Rafael Garzon		3,892.00
José Ariola		434.22
W. L. Ballard		88.12
N. W. Stewart		200.00
John Randrup	48.50	25.00
Emiliano Boncon		75.00
Chua Quico		663.39
Mathilda Lawlor		75.00
Tan Bagm		3.02
Yee Nam		500.00
C. M. Jenkins		39.00
Mariano Baretto		159.33
Simeon Batarina		4.00
Ireno Aviles	3.00	
J. Parsons		153.59
C. O. Sherill	150.00	
S. M. Gans	162.09	
Raymundo Valenzuala	80.00	
Roque A. Santos	974.05	
R. H. Brotherton	60.00	
Levy Hermanos		121.97
Manila Plumbing Company		39.00
Cua Yeo		520.00
Kong Yick Chong Company		25.29
C. P. Newberry	175.00	
W. M. Taylor	10.00	
Germann y Ca		18.75
Woodward & Co		292.225
W. D. Witham	150.00	
Eustaquio Borja		27.50
R. M. Coleco		28.21
José Uy Pongco		10.00
Severino Alijo		11.00
Robert V. Dell		30.00
U. S. Shoe Company	70.00	77.44
John W. Taylor	150.00	39.74
W. T. Irons	70.00	
Antonio de la Riva y Co		67.81
Baltazar Paran	190.00	
Henry M. Jones	362.50	
Lum Kickit	225.00	
Chu Nagu Tuy, Hongkong		724.125
Wm. H. Anderson, Hongkong		1.665
Cheon Lee & Co., Hongkong		2,725.175
Kelly, Walsh & Co., Hongkong		151.825
W. Brewer & Co., Hongkong		205.375
Riverly & Larzelere		875.00
Fernando Rafael		9.00
S. A. Reich	87.50	
Gregorio Lintag	300.00	
Sixta Camoa	110.00	
O. F. Campbell		2,437.50

Detailed statement of disbursements during the fiscal year ending June 30, 1902, showing to whom (individuals or firms) and for what purpose payments have been made—Cont'd.

	Bureau equipment and expenses.	Purchase of supplies.
Eusebio Santiago	$110.00	
Ygnacio S. Santiago		$11.00
Geo. R. Harvey	75.00	53.00
Theodoro R. Yangco		340.00
Wm. Long	75.00	
F. O. Roberts	89.75	286.34
Wells & Milne		267.25
McCondray & Co		400.00
Domingo y Santos		15.00
Dy Chiaco		205.07
P. A. Pearson		100.00
La Union, E. Ocampo, adr		1.50
Frank L. Strong		23,859.24
The Manila Times	55.00	
Tong Toc	43.50	
James S. Michael		486.46
Delmar W. Smith		1,503.86
La Leñara		27.00
C. D. Gooch	80.00	
Tan Ungco		68.00
E. W. McDaniels		300.00
Victor Gabriel		1.00
Salvador Dumalao	.75	
Tin Che Lung		1.25
Joaquin Avila	150.00	
Y. N. Tangco		5.00
Catalino Santiago		61.14
Cu Reco		11.50
Wiget & Uebelhardt		21.44
E. Aguilar & Co		136.90
Cnafre de Jesus	137.50	
M. De la Cruz		1.00
Frank R. Button	2,776.19	530.00
J. Rattenberg		80.50
Lorenzo Cruz		36.50
P. H. Rolfe		26.50
G. & C. Merriam Company		111.00
Gabriel de Jesus		3.56
Casanovia Garcia		15.25
Rafael Narbora		2.50
Leandro Claro		187.50
Sy Chuy Chin		2,817.77
J. H. Ankron	135.00	405.00
Dy Dac	200.00	
My Yet		19.74
Frederick W. Nask		17.50
Joseph N. Wolfson		850.00
Geo Hi	30.00	46.26
Sociétié Française des Charbonnages du Tonkin		12,818.14
Juan Soler		21.32
José P. Yutive		14.00
Charles Wall		8.25
Gregorio Quillentan		3.50
Mitsui Bussan Kaisha		41,722.605
M. Soler & Co		78.84
A. Sioco		224.35
Philippine Cold Stores, Limited		113.87
M. Martin	95.24	
P. Trinidad y Fernandez		11.625
J. B. Cooley	73.81	
A. Zollerbach & Sons		465.20
Thomas A. Cavonan		2.75
M. A. Clarke		5.00
C. Moises		4.00
Francisco Mariano		4.20
McKay, McKinnon & Co	347.30	8,025.82
Lambert & Prosby		450.00
Manila Sheet Metal Works		226.38
Hollman y Ca		14.00
Greilsammer Bros		8.70
Luis Ona Suy		1.12
Photograph and Typewriter Supply Company		28.72
C. Fressel & Co		1,133.38
Thoburn Press		14.24
Miner Winser		17.50
Philippine Gaslight Company		272.266
Mariano Pascual		22.50
R. W. Hettinger	64.29	
T. H. Meade	190.48	
John G. Slee	64.29	

Detailed statement of disbursements during the fiscal year ending June 30, 1902, showing to whom (individuals or firms) and for what purpose payments have been made—Cont'd.

	Bureau equipment and expenses.	Purchase of supplies.
Universal Hotel	$56.28	
José Davis	357.14	
Keuffel & Esser Company, San Francisco		$746.46
S. C. Farnham, Boyd & Co., Shanghai		921.00
W. W. Richards	69.05	
James J. Murphy	285.71	
Eastern Extension, Australia and China Telegraph Company	72.07	
Manuel Silvestre		22.64
Manila Book and Stationery Company		67.67
Uy Chuyco		12.50
L. D. Martinez		361.40
Thomas E. Evans & Co		739.80
Sloan & Mitchell		165.00
F. Guiterrez y Ca		113.36
American Carriage Works	267.66	
R. A. Smith	95.24	
J. G. Holcombe, Cebu	858.62	
T. E. Carroll	71.43	
Edw. P. Lawton		3,000.00
Tomas Sia Loca		1,245.60
Mariano Montañez		45.855
Jacinto Boada	711.45	
Luis A. Bonlay	46.00	
Smith & Reed		580.515
Hilario Leninco y Hos		6.25
Alejandro Manuel		9.75
Squires & Bingham		177.35
C. Kauffmann		229.955
T. de los Reyes		92.60
Mariano de Ocampo		504.16
Pablo Co Quinco		37.315
Engineer officer, U. S. Army		1,045.00
Juan Ferrer		20.00
Francisco Gambe		31.70
Roberto Garcia		9.375
Arthur F. Allen	864.00	1,631.83
Central Studio		66.61
American Book Company		10,471.14
Botica de Santa Cruz		36.77
Flint, Eddy and American Trading Company		60,634.82
El Comercio	2.12	
De Ce		2.20
American Nursery Company		10.00
Julian Escodera		22.03
J. G. Vogelgesang		11.01
Testementaria de Boie y Schadenberg		104.99
Trenvia Vapor de Rio Pasig		1.10
Wassiamull, Assomull & Co		29.73
Silver, Burdett & Co., New York		4,705.61
Josephine Reynosa	66.08	
Chartered Bank of India, Australia, and China		28.26
N. T. Hashim		7.93
Philippine customs service		1,216.48
Mariano Obispo		97.80
Geo. P. Ahern	55.07	
T. W. Grove		27.09
H. L. Hankinson	28.05	
Pedro Blanc		3,639.79
The Manila Railway Company, Limited		219.98
Melecio Escobar		52.68
Mariano Moreno		722.83
Alfredo Balbas		7.26
Gregorio Ocampo		936.13
Lee Ching		5.73
Le Gloria (Dy Bioco, proprietor)		25.11
Loong Foo		56.39
Frank Martin		100.00
La Vinda de Tan Auco		59.51
Juan Rodriguez		72.92
The Lawyers' Cooperative Publishing Company		200.00
Sotero de los Santos		421.59
M. C. Santiago		407.96
Giza Ross		4.70
John F. McKinnon		467.40
Otto O. Hanson	405.29	
Jno. E. Enright	29.23	
Geronimo José		72.08
G. Urrutia y Ca		109.43
F. M. Yaptico		12.51
Naviera Mercantil Filipina		1.67

Detailed statement of disbursements during the fiscal year ending June 30, 1902, showing to whom (individuals or firms) and for what purpose payments have been made—Cont'd.

	Bureau equipment and expenses.	Purchase of supplies.
La Rosario		$6.76
Siuliong & Co		16.58
Sy Giang		25.96
L. A. Parkinson		2.00
R. M. Crowine	$158.59	
Tan Jioco		7.05
Charles Miller		73.39
Howorth-Erskine, Limited, Shanghai		697.86
Luis Moreno		35.24
Zee Tai On		9.74
H. J. Andrews & Co		20.93
United States Philippine Commission		1.76
Sy Jungco		4.92
American Book and News Company		414.15
Kwong On Lung & Co		28.96
Gan Fianco		70.49
Freedom Publishing Company	10.49	
The River Steam and Lighter Company		5.29
Martinez Guzman		11.01
G. R. Smith		117.50
Eastern Electric Company, incorporated		21.14
Horace L. Higgins, concessionair		3.39
Armstrong & Mackay		4.63
Luis Hidalgo & Co		58.35
Mendezona y Ca., in liquidation		19.61
Hongkong and Shanghai Banking Corporation	17.00	
Union Farmaceutica Filipina		64.32
Frederick J. Barker		75.00
Manila Saw Mill		89.92
Bazar Siglo XX		167.64
Manila Grocery Company		4.26
Perez y Ca		9.91
Studebaker Bros., of California		1,209.00
The Manila Carriage Factory	3,747.425	2,146.15
A. G. Sibrand-Seigert		21.75
Wm. H. C. Bowen		175.00
José A. Zapiram		1,762.11
Chua Ling Company		70.49
Joseph Anderson		115.00
Vitoco		10.00
Son Poico		20.63
La Fuenta y Ca		13.13
H. J. Seeley		55.00
Louis Beliso		30.60
Total	72,388.22	838,900.365

Statement of sales and collections, fiscal year 1902.

[United States currency.]

Total sales, per Exhibit A		$985,274.89
Total collections to June 30, 1902, inclusive	$818,824.64	
Total accounts outstanding June 30, 1902, per Exhibit A	149,770.19	
Losses due to variations in the Government rate of exchange	16,680.06	
		985,274.89
Total collections		818,824.64
Total deposits with treasurer, P. A		669,207.58
Balance on hand June 30, 1902		149,617.06

Statement showing total sales made by the insular purchasing agent to the various bureaus and departments of the insular government for fiscal year 1902, and outstanding accounts June 30, 1902.

To whom sold.	Total sales.	Outstanding accounts.
Bureau of public instruction	$195,366.19	$17,072.54
Santa Cruz bridge	13,049.51	41.07
The city engineer, Manila	12,788.56	1,054.49
The auditor	4,942.88	240.30
Executive bureau	4,681.12	180.73
Philippine constabulary	115,426.32	1,102.34
Attorney-general	5,830.12	1,361.26
Intendencia building, custodian of	539.21	73.94
The Philippine Commission	3,496.75	91.22
Collector of customs	45,627.97	8,423.00
The city attorney	3,052.96	....
City assessor and collector	8,448.26	56.80
Department of streets, parks, bridges, docks, and wharves	93,533.34	197.70
Department of water supply and sewers	24,651.02	....
Board of health	22,041,47	....
Municipal board	3,076.20	5.23
Captain of the port	20,454.16	6,003.81
Province of Capiz	4,069.98	3,648.38
Forestry bureau	4,881.59	1,053.48
Province of Pampanga	2,114.90	183.04
United States Military Prison, Bacolor	518.32	....
Ayuntamiento building, custodian of	591.32	185.46
The treasurer	31,014.90	19,606.54
San Lazaro Hospital	3,462.20	40.54
Insular cold storage and ice plant	67,264.58	16,770.89
Department of fires	14,314.26	736.79
The sheriff of Manila	502.21	23.34
Municipal court, north of Pasig	820.19	....
Woman's Hospital	4,742.28	....
Postmaster, Cavite	1.98	....
Postmaster, Manila	651.21	....
Civil service board	3,098.35	50.64
The supreme court	2,494.14	1,146.23
Court of first instance, thirteenth district, Zamboanga	157.88	....
Justice of peace court, Manila	221.25	....
Province of Cavite	743.94	194.86
Improvement of the port, Manila	3,117.61	....
Department of police, Manila	40,347.73	17,102.21
Municipal court, south of Pasig	470.14	....
Province of Bataan	302.99	21.08
Province of Albay	2,532.77	1,808.22
The Nautical School	343.75	118.03
Department of buildings and illumination	3,632.09	21.95
Court of first instance, Manila	1,852.35	7.60
Province of Cebu	4,330.69	2,285.78
The chief signal officer	1,154.92	....
Director-general of posts	459.45	....
Province of La Unión	4,713.34	1,538.94
Department of the interior	507.41	36.74
Department of the city schools	1,442.87	....
Bureau of mining	832.33	4.53
United States Coast and Geodetic Survey	2,478.01	189.89
The quarantine officer	5,924.39	1,538.94
Province of Pangasinan	4,979.63	2,822.61
Province of Rizal	2,580.72	181.96
The Civil Hospital	3,201.99	300.39
United States Military Prison, San Isidro	850.20	....
Prosecuting attorney	1,239.63	....
Bureau of non-Christian tribes	851.48	107.16
Bureau of public lands	908.15	....
Bureau of architecture	27,040.63	15,725.51
Province of Cagayan	1,388.88	508.80
Province of Leyte	2,841.39	401.90
Province of Occidental Negros	2,818.50	1,234.91
Province of Isabela	1,909.54	393.18
Bureau of government laboratories	3,527.16	266.38
Bilibid prison	19,248.10	1,316.76
Province of Zambales	1,179.25	433.67
Province of Tarlac	1,774.09	109.10
Insular purchasing agent	37,695.61	....
Provinces of Ilocos Sur	3,078.77	439.47
Province of Nueva Ecija	4,993.38	2,339.16
Province of Bulacan	1,802.07	109.55
Bureau of ethnology and natural history	186.95	....
Province of Ilocos Norte	1,208.41	205.72
Department of public instruction	95.40	18.43
Municipal dispensary (board of health)	1.30	....
Province of Marinduque	3,908.25	3,626.65
Province of Sorsogon	4,699.83	1,645.95
Province of Ambos Camarines	2,491.14	359.16
Province of Iloilo	2,006.33	45.69

Statement showing total sales made by the insular purchasing agent to the various bureaus and departments of the insular governmant for fiscal year 1902, and outstanding acccounts June 30, 1902—Continued.

To whom sold.	Total sales.	Outstanding accounts.
Province of Romblon	$158.29	$12.57
Province of Oriental Negros	3,091.43	1,318.26
United States Military Prison, Lingayan	123.42	123.42
Province of Abra	922.66	922.66
Engineer in charge of Benguet road	15,366.11	1,394.19
Secretary of finance and justice	176.48	
Secretary of commerce and police	116.33	
Province of Masbate	1,933.86	1,933.86
District commander of Polock	17.87	17.53
Province of Tayabas	2,485.42	424.28
Court first instance, thirteenth district, Zamboanga	631.45	3.06
Province of Antique	300.40	33.30
Plague Hospital	163.10	
Trade School	678.59	209.17
Province of Batangas	743.49	81.42
Province of Bohol	562.59	452.53
Bureau of public printing	6,839.01	1,510.53
Province of Surigao	1,264.18	451.35
Court of first instance, Cebu	193.38	13.32
Court of first instance, Pangasinan	50.18	
Office of civil affairs	158.79	
Collector of internal revenue	517.66	
The Government Farm, San Ramon	1,790.15	60.26
Sanitarium, Benguet (civil hospital)	61.98	4.94
Secret service bureau	3.99	
Province of Misamis	490.24	227.74
Bureau of archives	223.31	9.36
Weather bureau	391.84	
Court of first instance, Santa Cruz	219.51	
Judge, sixth judicial district	98.45	98.45
District commander, Isabela de Basilan	533.70	100.82
Bureau of statistics	54.09	
Court of first instance, Cavite	106.62	106.62
Province of Benguet	47.33	.62
The Normal School, Manila	4.35	
Engineer officer, Seventh Separate Brigade	51.00	51.00
Bureau of coast guard and transportation	3,190.01	789.17
Province of Nueva Vizcaya	376.64	376.64
Pail system	1,842.69	
Bureau of agriculture	3,553.42	1,603.77
Military Prison, Malagui Island	2,512.11	
Court of customs appeals	314.20	314.20
Province of Lepanto-Bontoc	239.84	239.84
Court of first instance, Lingayen	53.48	
Total	985,274.89	149,770.19

Summary of the transactions of the bureau at closing, September 30, 1902, with exchange at 2.40.

[United States currency.]

RECEIPTS.

From all sources	$1,635,019.836

DISBURSEMENTS.

Purchase of supplies, Manila	1,070,126.380
Transfers to D. A., Washington	346,507.53
Bureau equipment and expense	75,964.55
Salaries	51,102.92
Wages	51,311.825
Refunds to treasurer	24,678.155
Losses in value of cash on hand occasioned by variations in Government rate of exchange, fiscal year 1902	1,351.45
Balance on hand September 30, 1902 [a]	13,977.025
	$1,635,019.836

CHAS. ESPE, JR.
Disbursing Officer, Bureau of the Insular Purchasing Agent.

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[a] Cash on hand consists of $1,607.55 United States currency, $29,686.74 local currency.

Disbursing officer's statement supplemental to report for the fiscal year 1902, showing total receipts and disbursements for the period ending September 30, 1902.

	Receipts.		Disbursements.		Reduced to United States currency at $2.40 local currency equals $1 United States currency, the rate in effect September 30, 1902.[a]	
	United States currency.	Local currency.	United States currency.	Local currency.	Total receipts.	Total disbursements.
Total receipts fiscal year 1902, as per statement rendered	$1,237,218.885				$1,237,218.885	
Receipts for first quarter fiscal year 1903, as per detailed statment annexed, viz:						
From treasurer, P. A., on sundry warrants	102,000.00				102,000.00	
Do		$712,952.25			297,063.44	
Refunds		1.70			.71	
Purchase of supplies, fiscal year 1902, as per statement rendered			$838,900.365			$838,900.365
Purchase of supplies, first quarter, fiscal year 1903			100,501.08			100,501.08
Do				313,739.84		130,724.935
Transfers to D. A., Washington, D. C., fiscal year 1902, per statement rendered			200,000.00			200,000.00
Transfers to D. A., Washington, D. C., first quarter, fiscal year 1903				351,618.08		146,507.53
Bureau equipment and expense, fiscal year 1902, as per statement rendered			72,388.22			72,388.22
Contingent expenses, first quarter, fiscal year 1903				8,583.20		3,576.33
Salaries, fiscal year 1902, as per statement rendered			38,896.25			38,896.25
Salaries, first quarter fiscal year 1903				29,295.99		12,206.67
Wages, fiscal year 1902, as per statement rendered			37,569.975			37,569.975
Wages, first quarter fiscal year 1903				32,980.44		13,741.85
Refunds to treasurer, P. A., unexpended balances of appropriations, fiscal year 1902			24,678.155			24,678.155
Losses in value of cash on hand occasioned by variations in Government rate of exchange, fiscal year 1902			1,351.46			1,351.46
Total actual receipts and disbursements	1,339,218.885	712,953.95	1,314,285.495	736,217.55	1,636,283.035	1,621,042.81
Less dropped from balance on hand June 30	[b]23,325.84				[b]23,325.84	
					1,612,957.195	1,621,042.81
And taken up as on hand July 1		52,950.34			[c]22,062.640	
Balance on hand September 30			1,607.55	29,686.74		1,607.55 12,369.475
Total	1,315,893.045	765,904.29	1,315,893.015	765,904.29	1,635,019.835	1,635,019.835

[a] This column not a part of office records. It is carried here to show all transactions in a common currency.

[b] Deduct.

[c] Add.

I certify that the foregoing is a true and correct statement of the receipts and disbursements of all funds appropriated and made available for the bureau of the insular purchasing agent for the period ending September 30, 1902.

CHAS. ESPLIN, Jr.,
Disbursing Officer Bureau of the Insular Purchasing Agent.

Summary of receipts and disbursements for the quarter ending September 30, 1902, fiscal year 1903.

		U. S. currency, purchase of supplies.	Local currency.			Total U. S. currency.	Total local currency.
			Purchase of supplies.	Salaries and wages.	Contingent expenses.		
	From whom received.						
1902. July 1	Balance on hand, June 30	$108.63	$52,950.34			$108.63	$52,950.34
	Treasurer, P. A.—						
3	Warrant No. 1652	92,000.00				92,000.00	
23	Warrant No. 1658		117,500.00				117,500.00
23	Warrant No. 1661		117,500.00				117,500.00
28	Warrant No. 1675			$21,349.75	$5,875.00		27,224.75
28	American Book and News Company, refund		1.70				1.70
	Treasurer, P. A.—						
Aug. 26	Warrant No. 1832	10,000.00				10,000.00	
26	Warrant No. 1831		117,500.00				117,500.00
26	Warrant No. 1833			21,361.50	7,050.00		28,411.50
Sept. 4	Warrant No. 1879		235,000.00				235,000.00
29	Warrant No. 1922		48,000.00				48,000.00
29	Warrant No. 1921			21,816.00			21,816.00
	Total	102,108,63	688,452.04	64,527.25	12,925.00	102,108.63	765,904.29
	For what paid.						
July 22	Transfer to D. A., Washington, D. C., $50,000 gold		116,618.08				116,618.08
31	Disbursements, July	90,615.35	98,137.22	19,623.72	2,442.35	90,615.35	120,203.29
Aug. 31	Disbursements, August	8,164.62	130,170.31	21,953.57	3,025.18	8,164.62	155,149.06
Sept. 8	Transfer to D. A., Washington, D. C., $100,000 gold		235,000.00				235,000.00
30	Disbursements, September	1,721.11	85,432.31	20,699.14	3,115.67	1,721.11	109,247.12
30	Balance on hand	1,607.55	23,094.12	2,250.82	4,341.80	1,607.55	29,686.74
	Total	102,108.63	688,452.04	64,527.25	12,925.00	102,108.63	765,904.29

Statement of sales and collections for the period (fiscal year 1902 and first quarter fiscal year 1903), September 30, 1902.

	As carried on records.		United States currency at 2.40, rate of exchange in effect on date of closing, September 30, 1902.					
	United States currency.	Local currency.	Purchase of supplies.		Act 231.		Total collections.	Total sales.
	Debtor.	*Creditor.*	*Debtor.*	*Creditor.*	*Debtor.*	*Creditor.*	*Debtor.*	*Creditor.*
Sales, fiscal year 1902, as per statement rendered	$985,274.89			$901,745.97		$83,528.92		$985,274.89
Sales, first quarter fiscal year 1903		$640,169.94		245,473.17		21,264.30		266,737.47
Collections, fiscal year 1902	818,824.64		$748,911.19		$69,913.45		$818,824.64	
Collections, first quarter fiscal year 1903	13,458.30	297,540.44	124,867.36		12,566.12		137,433.48	
Accounts transferred to auditor, first quarter fiscal year 1903		437,103.52	165,567.25		16,556.72		182,123.97	
Accounts outstanding September 30	42,685.94	163,424.00	103,858.67		6,920.60		110,779.27	
Apparent loss and gain due to variations in Government rate of exchange			[a] 4,014.67			[b] 1,163.67	[c] 2,851.00	
Total			1,147,219.14	1,147,219.14	105,956.89	105,956.89	1,252,012.36	1,252,012.36

[a] Apparent loss. [b] Apparent gain. [c] Apparent net loss.

SUMMARY.

Total sales			$1,252,012.36
Cash collections	$956,258.12		
Transferred to auditor	182,123.97		
Total collections		$1,138,382.09	
Outstanding from fiscal year 1902	42,685.94		
Outstanding on new business	68,093.33		
Out on account loss in exchange	2,851.00		
Total outstanding		113,630.27	
		1,252,012.36	1,252,012.36

Statement of stock on hand October 1, 1902.

[United States currency.]

Leather belting and hose	$1,678.05
Blacksmith and carpenter tools and supplies	3,414.93
Arms, ammunition, etc	7,883.03
Engineer's supplies and instruments	10,684.57
General hardware, agricultural implements, and supplies	31,819.97
Paints, oils, glass, etc	7,855.14
Iron and steel	42,988.40
Stationery and office furniture	49,749.82
Typewriters and supplies	20,004.99
Transportation supplies and forage	21,029.52
Electrical supplies	2,836.72
Coal	21,000.00
Lumber	42,520.00
Total	263,465.14

I hereby certify the above statement to be correct.

Francis H. Garrett,
Chief of Division of Property.

EXHIBIT E.

MUNICIPAL BOARD, CITY OF MANILA.

CITY OF MANILA, OFFICE OF THE MUNICIPAL BOARD,
Manila, P. I., October 31, 1902.

The Honorable CIVIL GOVERNOR,
Philippine Islands, Manila, P. I.

SIR: In accordance with the provisions of section 14, act No. 183, United States Philippine Commission (the Manila charter), and your verbal instructions, the annual report of operations of the city of Manila for the period from August 7, 1901, to and including September 30, 1902, under the municipal board, is herewith respectfully transmitted.

We have the honor to be, sir, very respectfully,

A. CRUZ HERRERA,
President.
P. G. McDONNELL,
Member.
A. L. B. DAVIES,
Member.

REPORT OF THE CITY OF MANILA FOR THE PERIOD FROM AUGUST 7, 1901, TO SEPTEMBER 30, 1902.

Under section 4 of act No. 183 (Manila charter) of the United States Philippine Commission, enacted July 31, 1901, the government of the city of Manila was vested in a municipal board consisting of three members and a secretary, all of whom were appointed by the civil governor, by and with the consent of the Philippine Commission. One of these members was designated as president.

The following appointments were made by the civil governor and confirmed by resolution of the Philippine Commission on August 6, 1901, viz: Arsenio Cruz Herrera, president; Barry Baldwin and William Tutherly, members, and A. L. B. Davies, secretary. The provisions of the Manila charter went into effect by proclamation of the civil governor on August 7, 1901, upon which date the members of the board took the oath of office, filed their bonds, and organized as the municipal board of the city of Manila.

Brig. Gen. George W. Davis, U. S. Army, provost-marshal-general of Manila, in accordance with General Orders, No. 207, Headquarters Division of the Philippines, dated August 6, 1901, turned over all property, funds, and records pertaining to the city of Manila to the municipal board, the board designating the various officers appointed by the civil governor as heads of the different departments to take charge of the property and records relating to their respective departments and to assume the duties thereof.

On November 15, 1901, Barry Baldwin presented his resignation as member of the municipal board, which was accepted by the civil governor, and Charles H. Sleeper was appointed to fill the vacancy. On January 4, 1902, the resignation of William Tutherly was presented and accepted, and the vacancy was filled by the appointment of Percy G. McDonnell. C. H. Sleeper was granted leave of absence to visit the United States on June 20, 1902, and A. L. B. Davies was appointed temporary member to act during his absence.

The city government before this time had been under military authority, and all heads of departments were military officers, and the changes incident to the transfer from military to civil government necessitated a prodigious amount of work of reorganization. Many of the heads of departments who had been army officers previous to June 30, 1901, were still retained as officials under the civil government and, from their knowledge of the work of the departments in the past, were of great assistance in the work of reorganization.

Many changes have taken place in the city officials during the period covered by this report, all of which are noted in the reports of the separate departments. This has added to the difficulties of carrying on the city work, as it has been hard to find men in these islands to fill all vacancies.

During this period thirty-six ordinances have been passed by the municipal board, covering many regulations necessary for the government of the city. All ordinances and orders of the provost-marshal-general were adopted and put into effect and many have since been amended. All regulations necessary are being covered by ordinance as fast as possible, and every endeavor has been made by the board to give justice to all and to protect the person and property of the citizens of Manila.

The city of Manila is organized into the following departments:

Department of engineering and public works.
Police department.
Law department.
Fire department.
Department of assessments and collections.
Department of city schools.

ADVISORY BOARD.

An advisory board, consisting of one member from each of the eleven districts of the city of Manila, was organized under the charter, and have held regular sessions every two weeks and numerous special sessions when the necessity arose. Since the organization of this body two new districts have been added to the city and members appointed to represent them, thus making thirteen members in all. This board has been a great help to the municipal board in the government of the city, inasmuch as it has from time to time forwarded suggestions and recommendations relating to conditions within the city for consideration of the board. All the members being Filipinos, they have come in close touch with the native population, and have been able to bring their petitions and necessities before the board in such a way as to simplify the matter of legislation on their behalf. All ordinances have been passed upon by them before final action by the municipal board, and all large expenditures, amounting to $10,000 and over, have been submitted to them for approval.

EXHIBIT A.

Employees of the city of Manila.

MUNICIPAL BOARD.

1 president	$4,500
2 members, at $4,500	9,000
1 secretary	3,000
1 chief clerk	1,800
1 translator	1,800
3 clerks, at $1,600	4,800
4 clerks, at $1,200	4,800
2 clerks, at $900	1,800
3 messengers, at $120	360

ADVISORY BOARD.

1 secretary	1,400
13 members, at $5, two meetings per month	1,560

DISBURSING OFFICER.

1 disbursing officer	2,500
1 clerk	1,600
1 clerk	1,400
1 clerk	1,200
1 clerk	1,000
1 messenger	120

CITY ATTORNEY.

1 city attorney	$3,500
1 assistant city attorney	2,500
2 law clerks, at $1,800	3,600
1 clerk	1,400
1 clerk	1,200
1 translator	1,200
2 clerks, at $900	1,800
1 messenger	120

PROSECUTING ATTORNEY.

1 prosecuting attorney	4,500
1 first assistant prosecuting attorney	3,500
1 second assistant prosecuting attorney	2,500
1 third assistant prosecuting attorney	2,250
1 fourth assistant prosecuting attorney	2,000
2 clerks, at $1,400	2,800
1 clerk	1,200
2 translators, at $1,200	2,400
1 messenger	120

CITY SCHOOLS.

1 superintendent	paid by the insular government.
1 deputy superintendent	
1 clerk	1,600
2 clerks at $1,200	2,400
1 clerk	420
1 messenger	120

POLICE DEPARTMENT.

1 chief	3,500
1 assistant chief and inspector	2,500
1 assistant inspector	2,000
1 surgeon	1,800
1 assistant surgeon	1,200
1 chief clerk	1,800
1 assistant chief clerk	1,400
1 property clerk	1,400
2 stenographers at $1,400	2,800
1 interpreter and translator	1,400
3 clerks at $1,200	3,600
3 clerks at $600	1,800
2 interpreters at $900	1,800
4 interpreters at $600	2,400
2 messengers at $120	240
6 captains at $2, 000	12,000
3 lieutenants at $1,500	4,500
3 lieutenants at $1,200	3,600
20 sergeants, first-class, at $1, 200	24,000
20 roundsmen at 1,020	20,400
300 patrolmen at $900	270,000
28 sergeants, third class, at $360	10,080
28 roundsmen at $300	8,400
360 patrolmen at $240	86,400

SECRET SERVICE.

1 chief	3,000
1 detective	1,800
1 detective	1,600
1 detective	1,500
1 detective	1,400
6 detectives at $1,200	7,200

1 detective	$900
3 detectives at $600	1,800
3 detectives at $480	1,440
6 detectives at $240	1,440
1 clerk	1,200
1 messenger	120

RIVER AND HARBOR POLICE.

1 captain	$2,000
3 sergeants, first-class, at $1,200	3,600
3 roundsmen, at $1,020	3,060
24 patrolmen, at $900	21,600
3 sergeants, third class, at $360	1,080
3 roundsmen, at $300	900
24 patrolmen, at $240	5,760
1 sailing master	1,200
1 mate	900
1 engineer	480
1 assistant engineer	360
4 firemen, at $240	960
8 deck hands, at $150	1,200
4 boatmen, at $150	600

DEPARTMENT OF ENGINEERING.

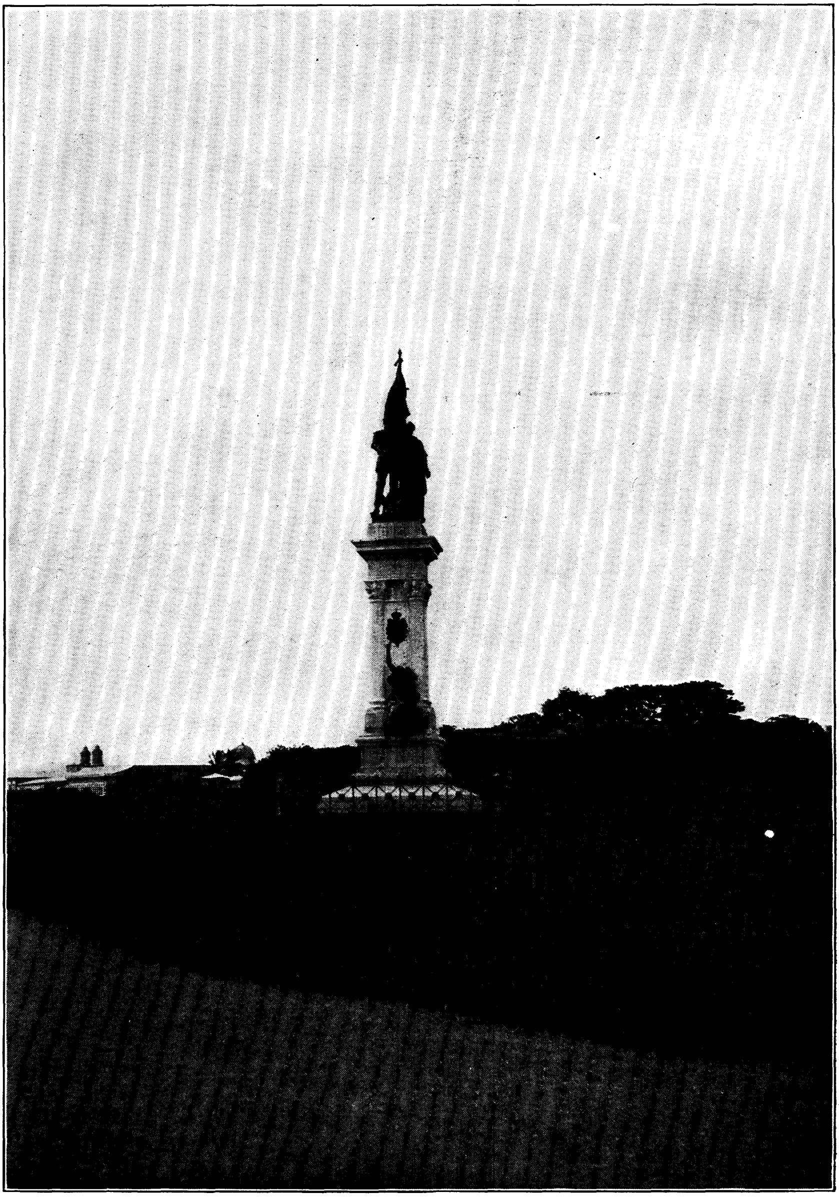
1 city engineer	
4 assistants to city engineer, at $2,500	10,000
4 assistants to superintendent of streets, at $1,800	7,200
1 engineer	1,800
1 chief clerk	1,800
1 property clerk	1,600
1 clerk	1,600
5 collectors, electricians, etc., at $1,400	7,000
2 clerks, at $1,000	2,000
14 clerks, inspectors, and instrument men, at $1,200	16,800
3 engineers, etc., at $900	2,700
5 clerks, storekeepers, etc., at $720	3,600
12 clerks, inspectors, etc., at $600	7,200
1 foreman, water service	540
2 assistant engineers, at $480	960
1 storekeeper	420
5 clerks and superintendents markets, at $360	1,800
16 clerks, draftsmen, etc., at $300	4,800
6 assistant engineers, chief janitors, etc., at $240	1,440
1 messenger	120

EMERGENCY EMPLOYEES.

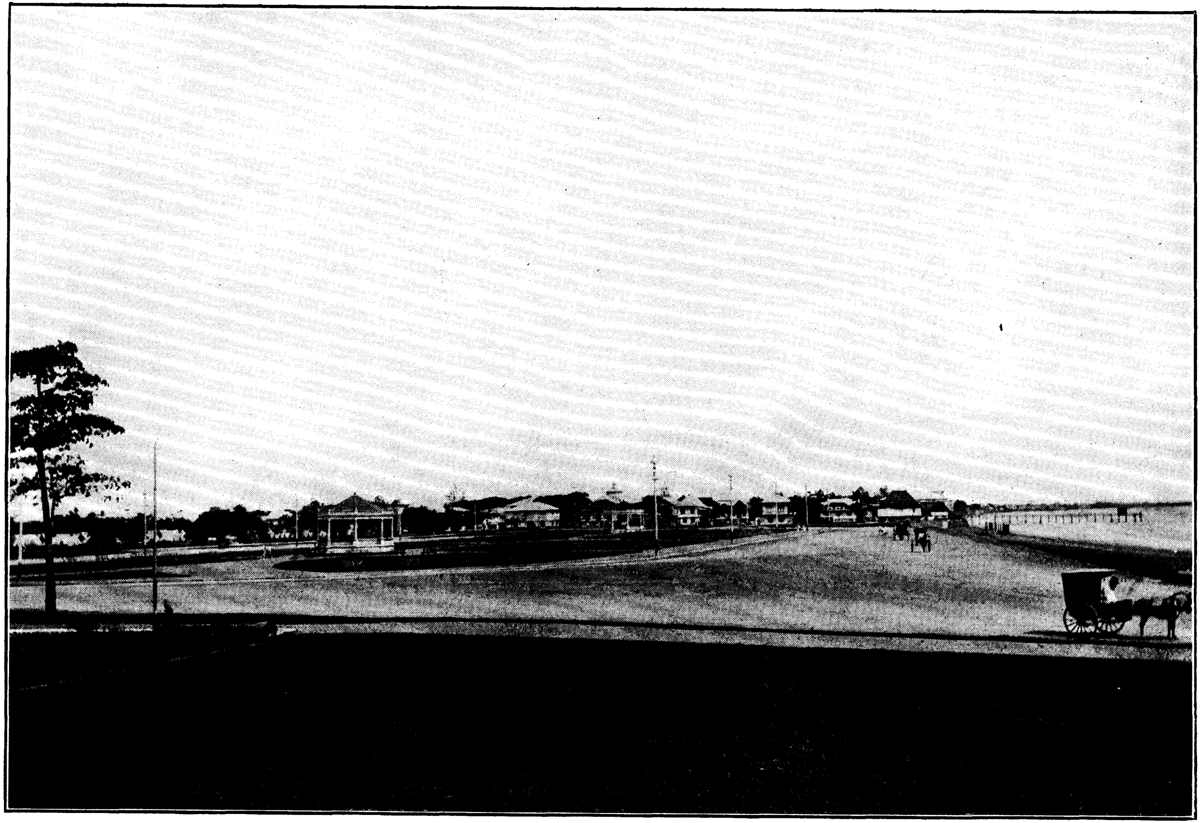
2 transit men, at $1,400	2,800
5 draftsmen and chainmen, at $420	2,100
6 chainmen and rodmen, at $300	1,800
5 foremen, at $600	3,000
9 foremen, at $420	3,780
1 captain and 1 engineer of launch, at $360	720
1 assistant engineer	300
1 steersman	240
2 firemen, at $180	360
3 sailors, at $120	360
1 veterinary surgeon	1,500
3 (harness maker, blacksmith, wheelwright), at $1,080	3,240
5 assistants to above, at $900	4,500
4 assistants to above, at $300	1,200
60 teamsters, at $840	50,400
100 teamsters, at $240	24,000
2 superintendents of cemeteries, at $360	720
3 oilers, at $240	720

AYUNTAMIENTO (CITY HALL), PRESENT HEADQUARTERS OF INSULAR GOVERNMENT.

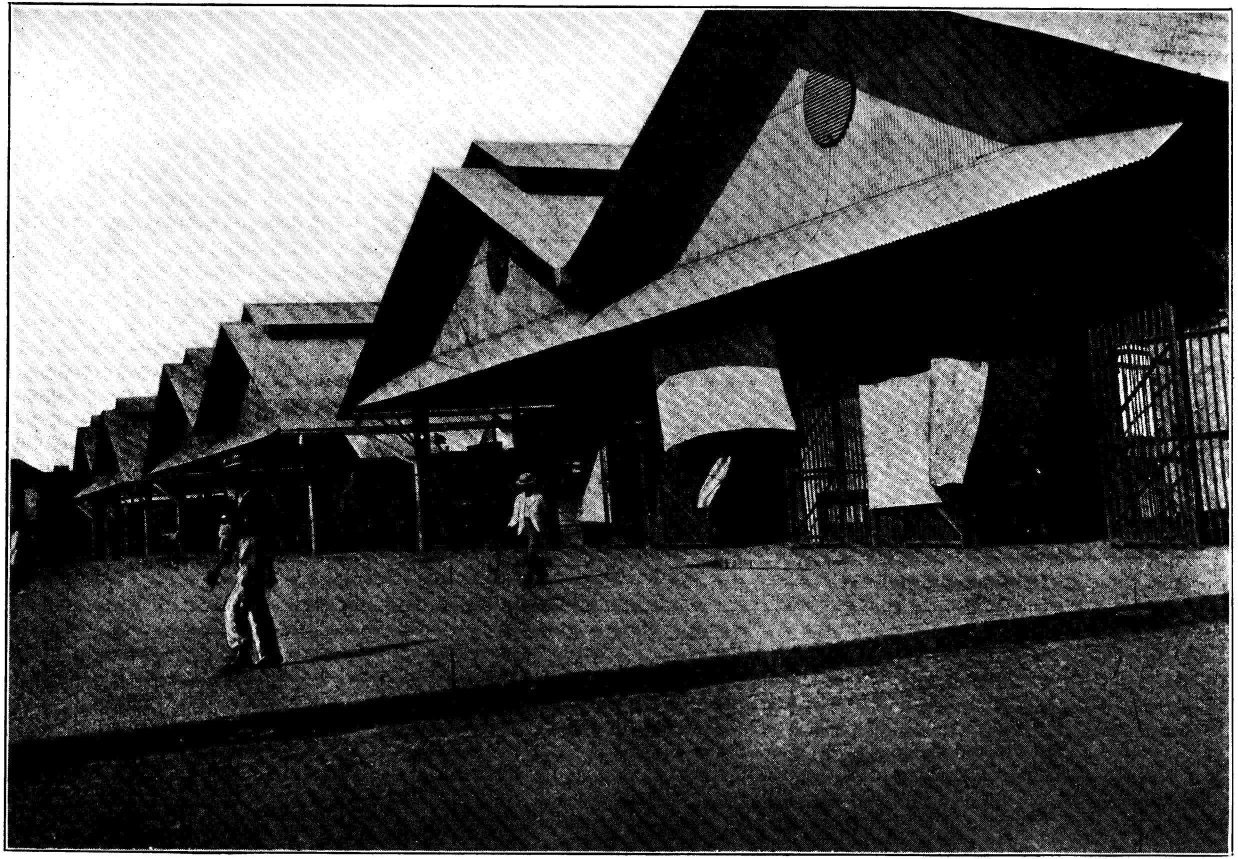
Taken during a reception in honor of Governor Taft.



LEGASPI AND URDANETA MONUMENT, NEAR LUNETA.

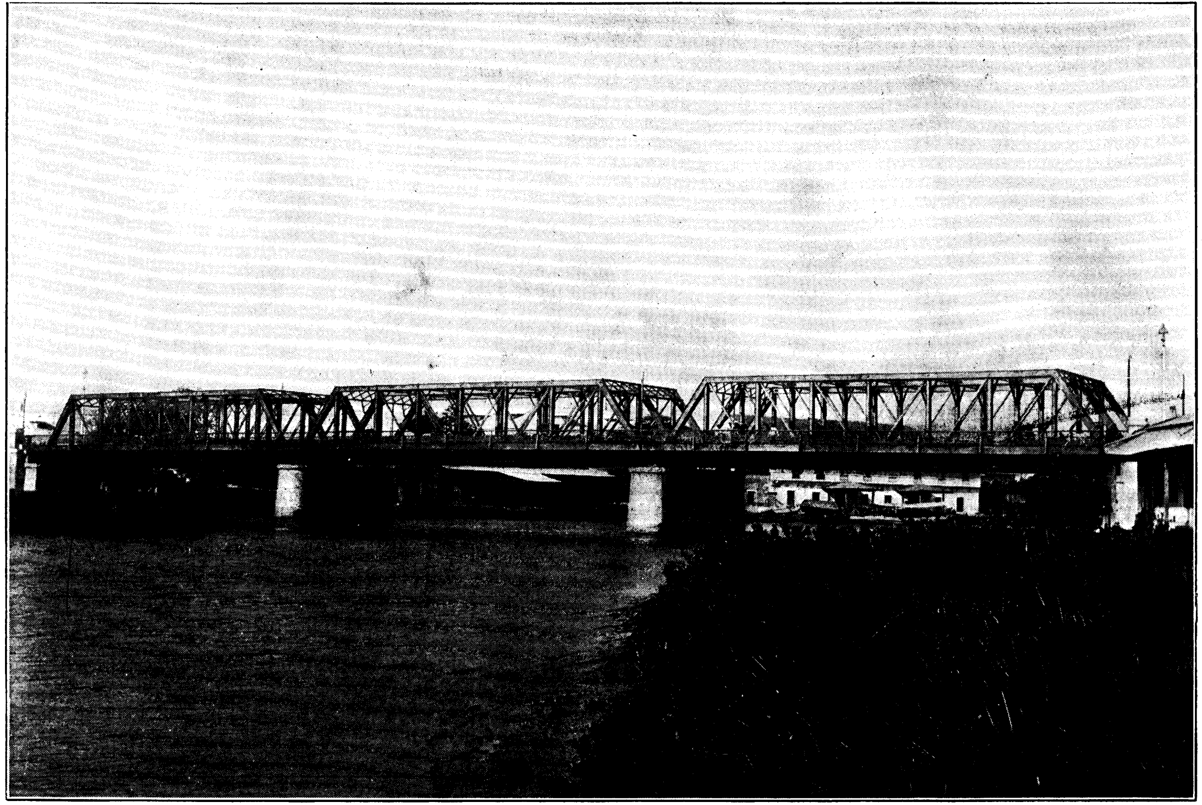


LUNETA FROM LEGASPI MONUMENT.



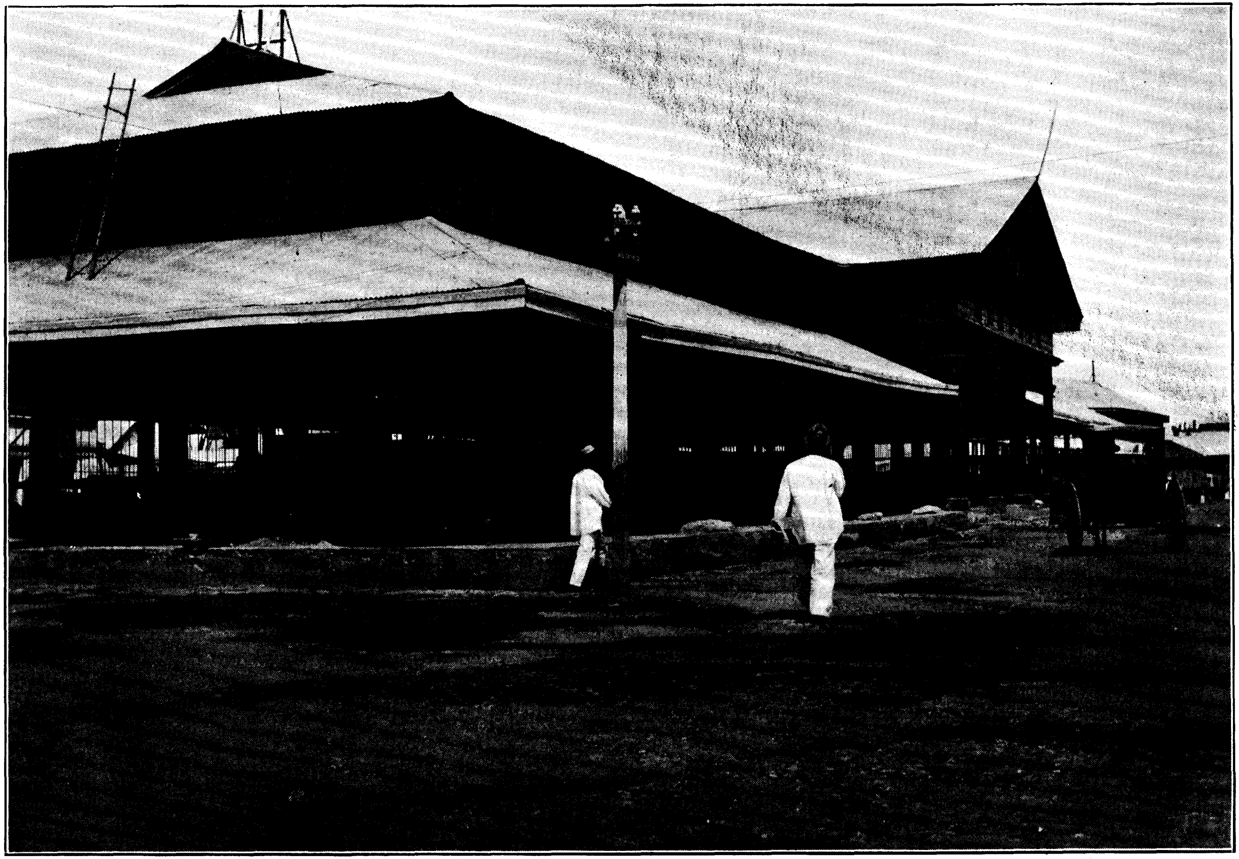
DIVISORIA MARKET.

Completed November 11, 1901. Cost $155,469.50.

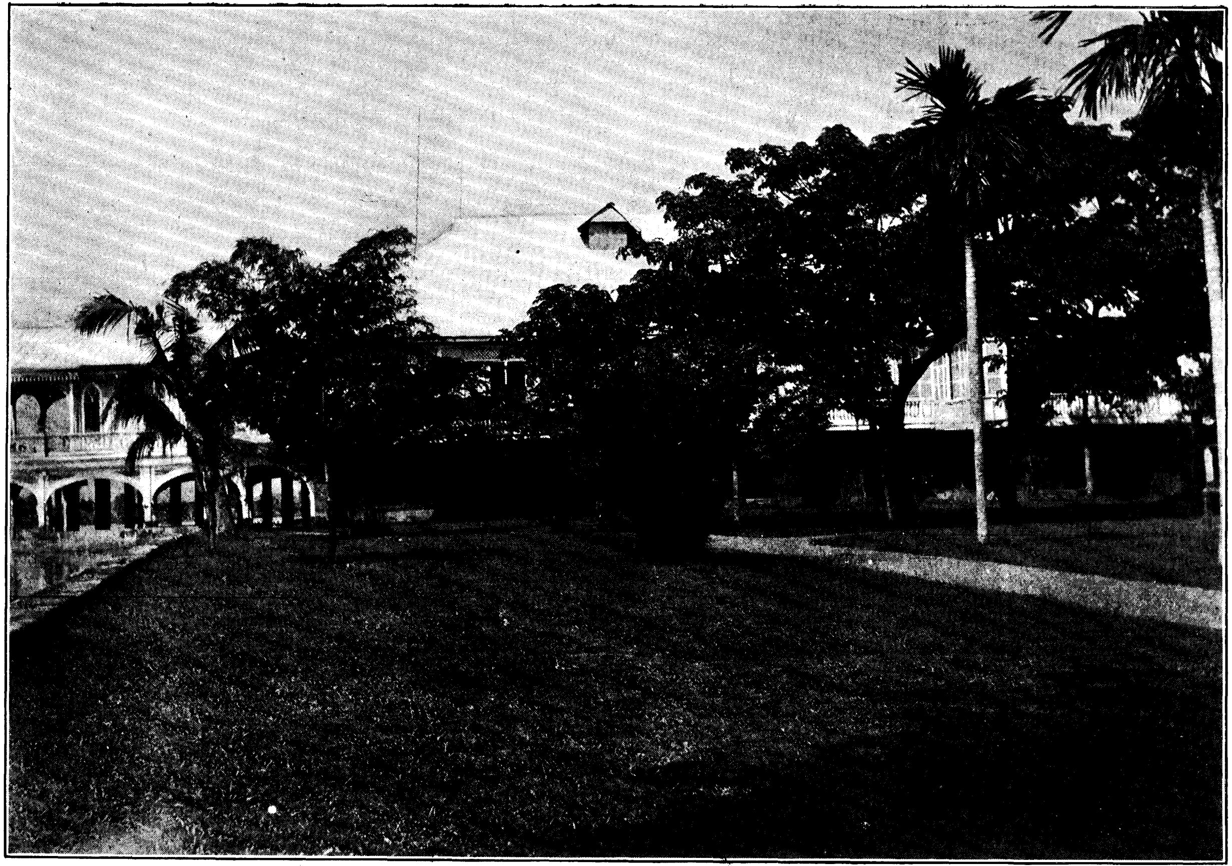


NEW SANTA CRUZ BRIDGE, PASIG RIVER.

Opened to traffic March 1, 1902. Cost $184,769.10.



ARRANQUE MARKET.



GROUNDS, MALACAÑAN PALACE, RESIDENCE GOVERNOR TAFT.

ERMITA PLAZA.

3 firemen, at $192	$576
2 laborers, at $210	420
2 mechanics, at $480	960
1 carpenter	180
40 laborers, at $144	5,760
3 pipe fitters, at $300	900
1 blacksmith	240
17 (pipe men, mason, and carpenter), at $180	3,060
15 pipe men, at $150	2,250
1 driver	120
1 teamster	720
1 mason	240
6 laborers, at $144	864
1,400 laborers, approximately, at $0.80 (Mexican) per day	[a]112,000

Receipts and expenditures of the city of Manila for the period from August 7, 1901, to September 30, 1902.

Receipts.	Amount.	Expenditures.	Amount.
Land tax	$624,186.11	Municipal board	$72,593.66
Industrial tax	251,594.14½	Law department	65,922.83
Stamp sales	84,803.66½	Fire department	60,646.96
Certificates of registration	58,891.24	Department of assessments and collections	107,201.83
Matadero tax	73,841.49½		
Market tax	127,334.02	Department city schools	80,235.34
Licenses	189,588.23½	Police department	648,147.62
Live-stock registration	627.33	Department engineering and public works	804,930.18
Vehicle tax	23,787.65½		
Vehicle equipment	1,686.32		
Municipal court fines and fees	88,373.29		
Justice of the peace court fines and fees	2,043.73½		
Sheriff's fees	2,907.19		
Frontage tax	21,592.36		
Rents	3,483.80		
Certificates of installation	1,405.48		
Miscellaneous	5,199.58½		
City attorney's fees	156.29		
Azcarraga improvement fund	489.95		
Registration of Cocheros	604.44		
Pound receipts	301.02		
Confiscated goods (police department)	355.75		
Water rents	67,932.22		
Building permits	7,062.81		
Weights and measures	2,442.15		
Cleaning vaults	376.57		
Total	1,641,066.85½	Total	1,839,678.42
30 per cent of city's expenses paid by insular government	551,903.52½	Balance to credit of city	353,291.86
Total	2,192,970.38	Total	2,192,970.38

[a] Mexican.

NOTE.—In order to arrive at the above statement all moneys have been reduced to United States currency. All reductions in case of receipts have been made in accordance with the rate upon the date of collection. In the expenditures, the months of August and September are the only ones shown in local currency, and they have been reduced at the respective rates during those months.

Statement of expenditures of the city of Manila during the first quarter, fiscal year 1903, supplemental to fiscal year 1902.

[Amounts expressed in United States currency.]

Name of departments and subdivisions.	July.	August.	September.	Total.
MUNICIPAL BOARD.				
Salaries, advisory board		$69.97		$69.97
Office supplies, advertising, etc	$44.63	13.20		57.83
Total	44.63	83.17		127.80
LAW DEPARTMENT.				
Office supplies, advertising, etc	170.07			170.07
Costs, fees, etc	2.20	10.23	$7.24	19.67
Transportation		16.33	11.59	27.92
Total	172.27	26.56	18.83	217.66
FIRE DEPARTMENT.				
Equipment for apparatus		748.33	35.63	783.96
Equipment for firemen		984.50		984.50
Office supplies, advertising, etc		77.04		77.04
General supplies		198.49		198.49
Transportation	26.00			26.00
Total	26.00	2,008.36	35.63	2,069.99
DEPARTMENT OF ASSESSMENTS AND COLLECTIONS.				
Salaries, regular force			88.55	88.55
Office supplies, advertising, etc	1,050.84		41.34	1,092.18
Total	1,050.84		129.89	1,180.73
DEPARTMENT OF CITY SCHOOLS.				
Salaries:				
Evening school-teachers	1,458.75	13.04		1,471.79
Native school-teachers	134.98	556.32		691.30
Office supplies, advertising, etc		28.98		28.98
Total	1,593.73	598.34		2,192.07
POLICE DEPARTMENT.				
Salaries:				
First-class policemen	262.50	360.13	164.21	786.84
Second and third class policemen		42.80		42.80
Detective bureau	699.83	208.50		908.33
Special cholera police		103.84	17.07	120.91
Equipment		1,675.37	5,308.49	6,983.86
General supplies, repairs, etc	9,043.06	1,959.17		11,002.23
Transportation	6.83	359.21		366.04
Total	10,012.22	4,709.02	5,489.77	20,211.01
DEPARTMENT OF ENGINEERING AND PUBLIC WORKS.				
Salaries:				
Classified employees	416.94	343.29	11.27	771.50
Unclassified employees	113.65	112.70		226.35
Repairs to city bridges	528.33	3.40		531.73
Purchase and transportation of road material	520.13	18.14		538.27
Repairs of sewers and drains	52.86			52.86
Purchase of coal for crematories, launches, etc	776.24			776.24
Purchase of tools, hose, etc	203.50	.82		204.32
Repairs to harness, wagons, launches, etc	206.90	33.25	629.29	869.44
Maintenance of grounds and parks	73.75			73.75
Repairs of markets and municipal buildings	201.07			201.07
Maintenance of electric light service	6,133.00	3,065.86		9,198.86
Maintenance of city water service	20.10	14.74		34.84
Completion of Arroceros shops	305.33	16.16		321.49
Erection of buildings, city pound	4,000.00			4,000.00
Santa Cruz bridge		325.51		325.51
Alteration and repair of Arranque Market		3,000.00		3,000.00
Santa Cruz fire station		82.10		82.10
Paco police station			2,450.00	2,450.00
Office supplies, advertising, etc	202.22			202.22
Transportation	116.36			116.36
Burial of pauper dead	26.43			26.43
Rentals of houses, lands, etc	211.53	82.55	30.85	324.93
Telephone service	101.00			101.00
Per diems of city engineer		170.00		170.00
Total	14,209.34	7,268.52	3,121.41	24,599.27

Statement of expenditures of the city of Manila during the first quarter, fiscal year 1903, supplemental to fiscal year 1902—Continued.

CONSOLIDATION OF DEPARTMENTS.

Name of departments and subdivisions.	July.	August.	September.	Total.
Municipal board	$44.63	$83.17		$127.80
Law department	172.27	26.56	$18.83	217.66
Fire department	26.00	2,008.36	35.63	2,069.99
Department of assessments and collections	1,050.84		129.89	1,180.73
Department of city schools	1,593.73	598.34		2,192.07
Police department	10,012.22	4,709.02	5,489.77	20,211.01
Department of engineering and public works	14,209.34	7,268.52	3,121.41	24,599.27
Total	27,109.03	14,693.97	8,795.53	50,598.53

Respectfully submitted.

R. C. BALDWIN,
Disbursing Officer, Municipal Board.

DISBURSING OFFICE MUNICIPAL BOARD,
Manila, P. I., October 27, 1902.

Statement of expenditures of the city of Manila during the first quarter fiscal year 1903.
[Amounts expressed in local currency.]

Name of department and subdivision.	August.	September.	Total.
MUNICIPAL BOARD.			
Salaries:			
Municipal board	$3,231.25	$2,350.00	$5,581.25
Secretary's office	2,384.45	3,011.88	5,396.33
Disbursing office	1,176.57	1,492.90	2,669.47
Advisory board	497.42	473.92	971.34
Office supplies, advertising, etc	333.96	229.14	563.10
Care of prisoners in Bilibid prison	4,921.84	3,991.24	8,913.08
Music for the Luneta	470.00	470.00	940.00
Total	13,015.49	12.019.08	25,034.57
LAW DEPARTMENT.			
Salaries:			
City attorney's office	2,718.17	2,953.17	5,671.34
Prosecuting attorney's office	2,564.46	2,970.82	5,535.28
Sheriff's office	1,292.50	1,880.00	3,172.50
Municipal courts	2,604.55	2,604.55	5,209.10
Justice of the peace courts	556.15	556.15	1,112.30
Office supplies, advertising, etc	1,183.04	411.97	1,595.01
Costs, fees, etc	157.49	4.00	161.49
Transportation	13.00	87.00	100.00
Total	11,089.36	11,467.66	22,557.02
FIRE DEPARTMENT.			
Salaries:			
Regular force	5,237.57	5,095.59	10,333.16
Temporary force	2,461.62	3,255.41	5,717.03
Equipment of firemen	194.70	114.40	309.10
Equipment of apparatus		542.85	542.85
Repairs to equipment	245.40	33.89	279.29
Office supplies, advertising, etc	383.89	22.29	406.18
General supplies	5,188.50	1,138.64	6,327.14
Transportation	11.75		11.75
Installation of fire and police alarm system	1,108.62	10,785.13	11,893.75
Total	14,832.05	20,988.20	35,820.25
DEPARTMENT OF ASSESSMENTS AND COLLECTIONS.			
Salaries:			
Regular force	8,911.62	10,431.01	19,342.63
Emergency force	5,081.85	4,643.35	9,725.20
Office supplies, advertising, etc	516.69	383.65	900.34
Transportation	102.95	68.20	171.15
Total	14,613.11	15,526.21	30,139.32
DEPARTMENT OF CITY SCHOOLS.			
Salaries:			
Office force	654.08	701.08	1,355.16
Evening school teachers		4,470.89	4,470.89
Native school teachers	10,412.85	10,324.73	20,737.58
Office supplies, advertising, etc	442.97	233.33	676.30
Total	11,509.90	15,730.03	27,239.93

Statement of expenditures of the city of Manila during the first quarter of fiscal year 1903—Continued.

Name of department and subdivision.	August.	September.	Total.
POLICE DEPARTMENT.			
Salaries:			
Office force	$3,276.97	$3,258.70	$6,535.67
First-class policeman	66,765.33	65,326.08	132,091.41
Second and third class policemen	20,066.19	19,524.65	39,590.84
Detective bureau	4,288.74	4,535.48	8,824.22
River and harbor policemen	7,460.47	7,261.11	14,721.58
Laborers, public pound	....	7.05	7.05
Special cholera policemen	8,376.04	3,905.98	12,282.02
Equipment	34.65	572.00	606.65
Secret-service fund	82.92	92.00	174.92
General supplies, repairs, etc	3,817.20	5,008.51	8,825.71
Meals for prisoners	724.60	886.16	1,610.76
Transportation	836.25	800.00	1,636.25
Total	115,729.36	111,177.72	226,907.08
DEPARTMENT OF ENGINEERING AND PUBLIC WORKS.			
Salaries:			
Classified employees	13,372.13	13,680.68	27,052.81
Unclassified employees	17,006.60	15,504.87	32,511.47
Ordinary labor	24,547.80	25,070.30	49,618.10
Repairs to city bridges	1,469.83	1,165.39	2,635.22
Purchase and transportation of road material	7,253.54	8,973.16	16,226.70
Purchase of forage	14,100.00	77.32	14,177.32
Repairs to sewers and drains	6,335.36	490.50	6,825.86
Repairs to city stables and corrals	330.36	4,616.81	4,947.17
Purchase of coal for crematories, launches, etc	3,279.63	1,651.65	4,931.28
Purchase of tools, hose, etc	967.11	1,603.10	2,570.21
Repairs to harness, wagons, launches, etc	4,559.20	325.15	4,884.35
Purchase of materials for shoeing	132.14	117.61	249.75
Maintenance of public grounds and parks	1,968.05	526.30	2,494.35
Removing rock crusher	6,212.49	1,845.22	8,057.71
Repairs to markets and municipal buildings	3,593.17	1,537.40	5,130.57
Supplies, cleaning and care of municipal buildings	585.16	401.89	987.05
Maintenance of electric-light service	7,001.02	7,051.50	14,052.52
Repairs and increase to electric-light service	250.24	1,043.61	1,293.85
Petroleum for lights in public buildings	523.47	....	523.47
Maintenance of city water service	13,826.89	7,648.18	21,475.07
Repairs to bridge of Spain	311.50	297.40	608.90
Repairs to Santa Cruz fire station	1,772.78	778.81	2,551.59
Completion of Arroceros shops	3,330.89	2,438.61	5,769.50
Hire of bulls, carts, and drivers	3,168.20	3,099.60	6,267.80
Supplies and materials for cemeteries	13.75	....	13.75
Office supplies, advertising, etc	665.44	349.62	1,015.06
Transportation	512.40	598.50	1,110.90
Burial of pauper dead	563.31	70.00	633.31
Rentals of houses, lands, etc	9,287.49	4,475.11	13,762.60
Telephone service	251.83	252.63	504.46
Clearing grounds for new improvements	175.25	40.00	215.25
Block map of Manila	896.08	797.83	1,693.91
Per diems of city engineer	364.25	364.25	728.50
Total	148,627.36	106,893.00	255,520.36

Aggregate, $623,218.53.

CONSOLIDATION OF DEPARTMENTS.

Name of department.	August.	September.	Total.
Municipal board	$13,015.49	$12,019.08	$25,034.57
Law department	11,089.36	11,467.66	22,557.02
Fire department	14,832.05	20,988.20	35,820.25
Department of assessments and collections	14,613.11	15,526.21	30,139.32
Department of city schools	11,509.90	15,730.03	27,239.93
Police department	115,729.36	111,177.72	226,907.08
Department of engineering and public works	148,627.36	106,893.00	255,520.36
Total	329,416.63	293,801.90	623,218.53

Disbursments made by disbursing officer	$514,110.56
Supplies purchased from insular purchasing agent	109,107.97
Total	623,218.53

Respectfully submitted.

R. C. BALDWIN,
Disbursing Officer, Municipal Board.

DISBURSING OFFICE, MUNICIPAL BOARD,
Manila, P. I., October 21, 1902.

Statement of expenditures of the municipal government of the city of Manila, P. I., during the fiscal year 1902.

[Amounts expressed in United States currency.]

	First quarter.	Second quarter.	Third quarter.	Fourth quarter.	Aggregate.
MUNICIPAL BOARD.					
Salaries—					
Members of the board	$1,100.00	$3,587.50	$4,112.50	$5,397.03	$14,197.03
Secretary's office	1,145.80	3,512.10	2,985.81	4,778.25	12,421.16
Advisory board		746.66	635.01	832.46	2,214.93
Disbursing office	485.22	1,724.99	1,838.32	2,031.86	6,080.39
Stationery and office supplies		523.87	1,050.96	1,325.97	2,900.80
Contingent expenses	8.12	298.64	351.20	848.19	1,506.15
Care of civil prisoners			9,004.52	11,703.36	20,707.88
Transportation			19.47	14.09	33.56
Music for the Luneta		400.00	620.00	800.00	1,820.00
Salaries, officials of Santa Ana				37.50	37.50
Total	2,739.14	10,793.76	20,617.79	27,768.71	61,919.40
LAW DEPARTMENT.					
Salaries—					
Office of the city attorney	920.44	3,928.33	3,712.78	4,716.57	13,278.12
Office of the prosecuting attorney	879.75	3,178.61	3,478.76	3,835.08	11,372.20
Municipal courts	530.55	2,961.15	3,324.96	4,326.95	11,143.61
Sheriff's office	506.01	2,011.10	2,374.99	3,139.59	8,031.69
Justice of the peace courts	180.67	711.32	709.98	928.92	2,530.89
Stationery and office supplies	12.47	1,636.29	2,545.61	3,297.99	7,492.36
Contingent expenses	503.80	849.73	474.02	280.93	2,108.48
Transportation	75.00	90.00	62.84	22.91	250.75
Total	3,608.69	15,366.53	16,683.94	20,548.94	56,208.10
FIRE DEPARTMENT.					
Salaries and wages	1,257.97	6,940.83	7,440.34	10,852.37	26,492.51
Equipment, fire apparatus		2,638.77	4,508.62	225.99	7,373.38
Horses			2,112.00		2,112.00
Stationery and office supplies		135.90	315.05	248.90	699.85
Contingent expenses	24.50	977.75	1,215.89	443.22	2,661.36
Transportation		47.00		29.38	76.38
General supplies		247.48	1,063.56	375.54	1,686.58
Forage		293.52	978.38	1,119.00	2,390.90
Salaries, fire-alarm installation				27.42	27.42
Total	1,283.47	11,281.25	17,633.84	13,321.82	43,520.38
DEPARTMENT OF ASSESSMENTS AND COLLECTIONS.					
Salaries—					
Regular force	3,936.34	14,285.04	14,741.41	17,134.91	50,097.70
Emergency force		7,483.65	16,611.83	9,019.55	33,115.03
Stationery and office supplies		3,178.18	2,974.15	1,442.73	7,595.06
Contingent expenses	1,064.10	550.55	382.34	42.49	2,039.48
Transportation	125.28	63.00	180.70	117.25	486.23
Total	5,125.72	25,560.42	34,890.43	27,756.93	93,333.50
DEPARTMENT OF CITY SCHOOLS.					
Salaries—					
Office force		1,422.90	1,029.99	1,247.61	3,700.50
Native teachers	2,920,93	10,130.70	10,623.89	15,161.75	38,837.27
Evening school teachers		10,197.00	8,024.50	2,427.59	20,649.09
Stationery and office supplies		1,528.95	610.81	310.62	2,450.38
Contingent expenses	229.90	209.46	175.26	167.42	782.04
Transportation	14.75	36.75	120.48		171.98
Total	3,165.58	23,525.76	20,584.93	19,314.99	66,591.26
POLICE DEPARTMENT.					
Salaries—					
Office force	1,513.54	5,021.91	4,007.79	5,819.60	16,362.84
Metropolitan police	36,847.46	99,742.05	92,709.51	112,926.37	342,225.39
Native police	8,597.49	26,597.50	26,100.00	35,274.41	96,569.40
Detective force	1,239.94	4,688.45	5,624.95	6,289.46	17,842.80
River and harbor police				11,692.49	11,692.49
Special and cholera police, Americans				14,492.50	14,492.50
Special cholera police, natives				1,792.59	1,792.59
Stationery and office supplies		149.27	1,551.78	801.51	2,502.56
Contingent expenses	181.70	628.55	2,035.11	5,152.18	7,997.54

Statement of expenditures of the municipal government of the city of Manila, P. I., during the fiscal year 1902—Continued.

	First quarter.	Second quarter.	Third quarter.	Fourth quarter.	Aggregate.
POLICE DEPARTMENT—continued.					
Equipment		$5,462.43	$1,020.31	$11,583.94	$18,066.68
Transportation		58.00	523.85	2,239.38	2,821.23
Total	$48,380.13	142,348.16	133,573.30	208,064.43	532,366.02
DEPARTMENT OF ENGINEERING AND PUBLIC WORKS.					
Salaries, office of the city engineer	1,529.43	5,148.34	4,821.67	5,312.92	16,812.36
Office of the superintendent of streets, etc	1,342.00	11,714.48	23,439.40	30,743.63	67,239.51
Office of the superintendent of water supply	2,046.75	6,272.40	7,848.03	8,822.02	24,989.20
Office of the superintendent of buildings and illumination	1,220.68	5,263.67	5,623.26	6,974.38	19,081.99
Ordinary labor	7,662.79	27,234.41	24,800.10	35,936.99	95,634.29
Stationery and office supplies	79.15	925.62	693.56	1,668.06	3,366.39
Tools and miscellaneous supplies		1,635.32	5,665.50	5,954.94	13,255.76
Coal for crematories, launches, etc			4,544.98	2,091.20	6,636.18
Forage for horses, mules, etc	543.42	1,042.66	8,940.73	9,014.66	19,541.47
Rentals	1,321.98	5,414.51	5,716.02	18,456.61	30,909.12
Transportation	10.50	794.21	933.47	833.50	2,571.68
Telephone service	48.02	129.33	346.97	282.50	806.82
Electric lighting		9,335.61	13,857.50	3,523.52	26,716.63
Miscellaneous expenses		55.51	112.40	1,501.12	1,669.03
Miscellaneous repairs			413.94	7.43	421.37
Maintenance of water supply system	638.70	5,306.45	11,526.77	13,772.01	31,243.93
Purchase and transportation of road material	14,582.40	12,945.00	21,637.37	21,209.30	70,374.07
Repairs to harness, wagons, launches, etc			1,215.97	1,629.93	2,845.90
Hire of bull carts	2,750.35	14,411.02	8,168.67	9,014.83	34,344.87
Cleaning cesspools and dry earth closets	112.32	3,039.84	873.48	1,795.92	5,821.56
Care of public buildings		394.94	1,921.08	2,913.61	5,229.63
Repairs to drains and sewers	154.25	4,055.99	1,546.12	2,267.18	8,023.54
Repairs to city bridges	81.20	1,623.07	2,694.22	2,019.23	6,417.72
Repairs and additions to city stables and corrals				1,074.77	1,074.77
Maintenance of public grounds			110.33	489.96	600.29
Clearing grounds for new improvements				1,801.81	1,801.81
Map of Manila			191.20	1,419.23	1,610.43
Arroceros shops				3,968.02	3,968.02
Santa Cruz fire station			163.42	3,129.82	3,293.24
Santa Cruz bridge	8,634.90	31,313.02	18,698.44	16,930.07	75,576.43
Anda street market		1,452.82	18.57	9,327.01	10,798.40
Divisorio market	1,649.70	7,089.83	4,086.34		12,825.87
Quinta market	2,058.20	1,815.07	1,661.05	6,848.36	12,382.68
Santolan road		170.43	181.50	63.65	415.58
Luneta sea wall	490.65	11.25	446.60	538.55	1,487.05
Purchase of horses, wagons, etc		17,344.36	21,496.17	6,712.68	45,553.21
Luneta settees			1,500.00		1,500.00
Purchase of scows				4,598.93	4,598.93
Herran market	848.11	258.65			1,106.76
Total	47,805.50	176,197.81	205,894.83	242,648.35	672,546.49

Total expended during the year, $1,526,485.15.

RECAPITULATION OF EXPENDITURES.

Municipal board	2,739.14	10,793.76	20,617.79	27,768.71	61,919.40
Law department	3,608.69	15,366.53	16,683.94	20,548.94	56,208.10
Fire department	1,283.47	11,281.25	17,633.84	13,321.82	43,520.38
Department of assessments and collections	5,125.72	25,560.42	34,890.43	27,756.93	93,333.50
Department of city schools	3,165.58	23,525.76	20,584.93	19,314.99	66,591.26
Police department	48,380.13	142,348.16	133,573.30	208,064.43	532,366.02
Department of engineering and public works	47,805.50	176,197.81	205,894.83	242,648.35	672,546.49
Total	112,108.23	405,073.69	449,879.06	559,424.17	1,526,485.15

Respectfully submitted.

R. C. BALDWIN,
Disbursing Officer, Municipal Board.

DISBURSING OFFICE, MUNICIPAL BOARD,
Manila, P. I., June 30, 1902.

BOARD OF HEALTH.

According to the provisions of act 157 and section 21 of the Manila charter, the board of health for the Philippine Islands acts in this city as a local board of health, notwithstanding it can not be considered as a subordinate and dependent department of the municipality of Manila.

For this reason, and owing to the fact that the said board sends its annual report directly to the insular government, it does not seem necessary to mention it to any extent in this report.

Nevertheless it is only just to state that the board of health has made itself worthy of the gratitude of the city by the zeal and activity which it displayed in combating against the onslaughts of bubonic plague and Asiatic cholera, as well as to promote public health. At its proposal the municipal board published fourteen ordinances, the titles of which are as follows:

No. 4. An ordinance concerning infectious or contagious diseases.

No. 5. An ordinance relating to buildings and premises infected with bubonic plague.

No. 6. An ordinance amending ordinance No. 3, entitled "An ordinance relating to registration and disposal of the dead."

No. 8. An ordinance relating to fees to be charged by the board of health.

No. 9. An ordinance authorizing the board of health to install the so-called "pail conservancy system" at the expense of the property owner.

No. 11. An ordinance amending ordinance No. 6, entitled "An ordinance relating to diseased animals."

No. 12. An ordinance relating to nipa houses.

No. 16. An ordinance regulating tenement and lodging houses.

No. 18. An ordinance amending ordinance No. 8, entitled "An ordinance regulating fees to be charged by the board of health."

No. 21. An ordinance prohibiting the practice of cleaning ears, scraping eyelids, or barbering in the streets, lanes, alleys, and public squares.

No. 22. An ordinance amending ordinance No. 4, entitled "An ordinance concerning infectious and contagious diseases."

No. 25. An ordinance relating to barbers, barbering, and hairdressing.

No. 26. An ordinance amending ordinance No. 8, issued by the provost-marshal-general, entitled "An ordinance establishing the department of health and fixing its powers and duties."

No. 30. An ordinance for the prevention and suppression of Asiatic cholera.

Immediately after the appearance of Asiatic cholera in the city, in March of the present year, it was deemed advisable to create special policemen to act as agents of the board of health. Their number and salaries up to the 30th of September of this year were as follows:

Month.	Number Americans employed.	Amount paid.	Number natives employed.	Amount paid.	Total employed.	Total amount paid.
March	49	$971.98	91	$542.33	140	**$1,514.32**
April	86	6,450.54	132	2,634.24	218	**9,084.78**
May	100	7,432.62	145	2,904.12	245	**10,336.74**
June	76	1,828.82	112	2,247.96	188	**4,076.78**
July	4	247.50	210	3,316.77	214	**3,564.27**
August	3	225.00	85	1,481.92	88	**1,706.92**
September			76	1,258.89	76	**1,258.89**
Total		17,156.47		14,386.23		**31,542.70**

The first special policemen were put on duty March 22, and June 11 all of the Americans but four were discharged.

DEPARTMENT OF ENGINEERING AND PUBLIC WORKS.

The report of the department of engineering and public works is given in two parts, the first part covering the period from August 7, 1901, to June 30, 1902, and the second part covers the period of the first quarter of the fiscal year 1903, July 1 to September 30. It will be noted that the statement of expenditures of the department is rendered both in United States currency and in local currency. This double statement is made necessary by the changes in the ratio and the fact that certain moneys were appropriated in gold and to be expended in the same currency, and others were appropriated and expended in local currency. The total expenditures of the department for the period from August 7, 1901, to September 30, 1902, amounts to $804,930.18, this being the largest sum of money expended in any of the city departments. The dilapidated condition of Manila under ordinary times, made vastly worse by neglect during the siege and insurrection, as well as by the lack of organization during the first few months after the organization of the city, rendered a vast amount of expensive repair immediately necessary. The military government undertook the building up of streets which had become full of holes, the repair of drains and buildings, the disposal of garbage and refuse and all other work pertaining to the care of the city, and managed to put things in a fairly presentable shape, clean at least, by the time civil government was established. This was an enormous task, and the officers who performed it can not be too highly praised. Since the 7th of August the department of engineering and public works has devoted the largest part of the time to simple maintenance and repair. New constructions and improvements have been planned, but have necessarily been laid aside for the present in order to enable the department to cope with the problem of keeping up a clean and healthful city and attending to the urgent reforms found necessary in every district. The tabulated statement which forms the first page of the detailed report shows the new public buildings that have been constructed or repaired during the year. The cost of labor and material has risen to such figures that construction of any kind is exceedingly expensive and difficult. The department has found the greatest difficulty in obtaining suitable engineers and assistants to carry on the skilled work. The department has never been completely equipped with officers and has suffered correspondingly. From time to time the office has drawn on the supply of provincial supervisors, but this method is not satisfactory, as it merely amounts to aiding the city at the expense of the provinces. The salaries paid are considered just, and the civil service board states that no difficulty is anticipated as soon as regular examinations begin at Washington and other places in the United States. The great demand for engineers in China and in every part of the archipelago where new industries are being developed has caused Manila to be looked upon as the recruiting point, and if some restriction such as is provided in act 224 of the United States Philippine Commission were not in force it would be exceedingly difficult to hold these men to their positions, for the others temporarily provide them with places paying greater salaries, which naturally would induce them to leave the municipal service.

The condition of the water service throughout the city renders a great amount of work and considerable expense immediately necessary. Further on in the report are detailed statements regarding the water consumption and the urgent need of an increase in the pumping facilities, as well as an extension of the actual pipe system. The board deems it exceedingly important that a competent engineer shall be engaged to plan a proper water and sewerage system for the city, and such an official should not be hampered with the ordinary duties of city engineer. Manila being in many parts below the level of the sea, and without any high ground in the near vicinity, raises a very delicate engineering problem. The Philippine bill permits the raising of $4,000,000 in bonds to be devoted to the installation of a sewer and water system.

During the year great activity has been noticeable in the repairing of old buildings and constructing new ones. The imposition of the land taxes for the first time has brought property owners face to face with the question of either improving their property in order to realize on it or selling. Many of the large landowners who have held most valuable parts of the city for years without improvement of any kind have been obliged to sell in order to meet their taxes, and land is being redistributed. During the quarter July 1 to September 30 permits for new buildings and repairs to old were issued to the value of $634,585 United States currency. It is expected that the next quarter will be still greater. All places are rapidly renting and the population is reaching out from the crowded streets to the more healthful suburbs. The installation of an electric railroad, franchise for which is about to be advertised, will develop the outlying portions of the city with great rapidity.

The filthy conditions of some of the quarters of the old city, and especially in the districts of Binondo and Tondo, which are very largely inhabited by the poorest classes of Chinese and Filipinos, caused these places to become regular pest holes during the cholera epidemic. It was practically beyond human endeavor to accomplish the cleaning of these germ-infested points. Great numbers of filthy shacks and moldy stone houses were destroyed, in all cases the owners receiving damages therefor, and this land has been cleaned and rendered habitable. On part of the city land the board has decided to construct a tenement house as an experiment, to cost about $6,800 United States currency. It is proposed to house people at a cost no larger than that which they are paying at the present time for filthy hovels built over swampy lands.

Great quantities of American lumber, especially pine and redwood, are being imported and taking the place of the native lumber. They are especially useful in cheap constructions and are used mainly in the upper stories, away from the damp and insect pests. However, it is probable that the wholesale introduction of material so inflammable in comparison with Philippine lumber will cause insurance rates to increase.

The board has petitioned the civil government for permission for the opening of suitable gates into the old Walled City, as the narrowness of the present approaches causes a great congestion of traffic. Plans have already been submitted for these openings, to be finished in a manner that will conform as far as possible to the old style of stonework. The completion of the harbor works will probably cause the razing of certain portions of the wall now facing on the Malecon drive and will undoubtedly necessitate more gates at this side of the city.

No city was ever more in need of playgrounds or recreation fields where the general public may seek amusement and exercise. The natives of the islands take readily to games, and with little encouragement would develop keen rivalry in many of the sports at the present time confined to the American and foreign population. Owing to the lack of ordinary healthful exercises and diversion, the great army of clerks and officials and the rapidly increasing American and foreign population find but little to do after office hours beyond going to clubs or driving, and both are expensive amusements.

The board is preparing plans for converting the large field in front of the Luneta, known as Camp Wallace, into a recreation ground open to everyone, where such sports as baseball, football, cricket, polo, and lawn tennis may be enjoyed. A part of the field will be devoted to a children's playground, modeled as nearly as possible after similar places in the United States. There is in preparation a plan for a city park, laid out with broad drives and walks, and also an aviary and zoological reserve, and all other elements of a modern park. With the introduction of an electric railroad such places would be accessible to everyone.

Under the care of Mr. J. C. Mehan, assistant superintendent of streets, in charge of parks and street cleaning, the botanical gardens on the Paseo de Bagumbayan have been improved and extended until they approach their former state under Spanish management. Originally this park had many beautiful trees and plants and a splendid collection of orchids, but nearly all of these, with the exception of the larger trees, were destroyed during the siege of the city and the insurrection. In this park are located the residences of the city engineer and the assistant superintendent of streets. During the last few months the deer park has been completed, neatly fenced with wire, and containing a number of deer of different kinds from the various islands of the archipelago. There is also a monkey cage, and from time to time the animals and buildings are being added to. This is a very popular resort with all classes, especially the Filipinos, and it is expected to rapidly enlarge it.

During the quarter ending September 30, 1902, plans were approved for the following public buildings: The fire station in the district of San Nicolas, to cost $12,000; the city morgue, $5,000; a bridge over the Binondo Canal, $12,000; school buildings, $20,000; central fire station, $20,000. The money was requested in the estimate of appropriation, and awaits the action of the Commission. The bridge across the Binondo Canal has been designed to relieve traffic at a point where it is most congested along the river front. It will furnish a means of communication between the Escolta and the business houses near it and the custom-house and office of the captain of the port. At the present time two small so-called ferries are in operation. These are scows about 10 feet long, poled by natives, and a nominal fee of 1 cent is charged for a fare. The most direct communication is by means of a long detour to Calle San Fernando, and this consumes ten minutes in order to drive from Plaza Cervantes to the custom-house, whereas with the new bridge it will be a matter of not more than three minutes.

At the end of May Captain McGregor, C. E., U. S. Army, was temporarily detailed on duty in this department and relieved of his military service. He has carried on the work since that date, and laboring under the disadvantage of being only a temporary appointee, he has nevertheless brought about many reforms and improvements. He found the department in a somewhat disorganized state and has placed it on a fairly sound basis. By a system of concentration of the work he has curtailed many of the duties formerly falling to assistants in the department and relieved some of the officers of responsibilities which were previously widely distributed. In this particular the experience has not shown great success, but with a longer time it might prove advantageous. The city should have its own permanent city engineer, and the board has been endeavoring to obtain such an official through the agency of the civil-service board. The supply of military engineers in the islands is small in consideration of the great work that lies before them, and the commanding general is anxious that all of his engineers should employ their time in work properly pertaining to the Engineer Corps.

The city expresses its hearty thanks for his kindness in detailing an engineer officer for city work under such circumstances. Attached is an abstract of public improvements for the year ending June 30, 1902; also a statement of the expenditures of the department; also a set of photographs illustrating the various works of the department and some of the buildings.

The department employs about 1,714 laborers, divided mainly into officers, mechanics, and laborers. Laborers are paid $1, 80 cents, and 60 cents per day, while a few subordinate assistants receive 50 cents and 40 cents a day. Wages are paid monthly. Ordinary labor is plentiful, while skilled labor is scarce. On the whole, Filipino labor has been very successful, but its value has been considerably hampered by the numerous fiestas and the after effects, such as laziness and extended absences. No Chinese are employed. The day consists of eight hours' work. The labor costs about 25 per cent more than it does in the United States and is of an inferior quality.

Abstract of public improvements for year ending June 30, 1902.

Completed.—Divisoria market, Quinta market, Santa Cruz bridge, Herran street market (extensive repairs).

Under construction.—Anda street market, city pound and police station, city shops, Arranque street market (extensive repairs).

Under contract, work not begun or material not delivered.—Police station, Paco; repairs to bridge of Spain (repaving); garbage crematory; automatic weighing machine for matadero; 10 street sprinkling wagons.

Plans completed for.—Central fire station; addition to city stables; schoolhouse, Tondo; schoolhouse, Gagalagin; Boulevard, Calle Iris to Azcarraga; municipal tenements; city morgue.

Expenditures, department of engineering and public works.

	Aug. 7, 1901, to June 30, 1902.	July 1, 1902, to Sept. 30, 1902.
	U. S. currency.	*Local currency.*
Salary and wages	$224,755.20	$109,182.38
Stationery and office supplies	3,568.61	1,015.06
Tools and miscellaneous supplies	13,460.08	2,819.96
Coal for crematories and launches	7,412.42	4,931.28
Forage	19,541.47	14,177,32
Rentals of buildings and lands	31,204.05	13,762.60
Transportation	2,688.04	1,110.90
Telephone service	907.82	504.46
Electric lighting	35,915.49	15,346.37
Miscellaneous expenses	2,090.40	
Maintenance of water system	31,278.77	21,475.07
Purchase and transportation of road material	70,912.34	16,226.70
Repairs, harness, wagons, and launches	3,715.34	4,844.35
Hire of bull carts	34,344.87	6,267.80
Cleaning cesspools and dry-earth closets	5,821.56	6,118.62
Care of public buildings	5,430.70	6,118.62
Repairs to drains and sewers	8,076.40	6,825.86
Repairs to bridges	6,949.45	3,244.12
Repairs and additions to city stables	1,074.77	4,947.17
Maintenance of public grounds	674.04	2,508.10
Clearing ground for new improvement	1,801.81	215.25
Map of Manila	1,610.43	1,693.91
Arroceros shops	4,289.51	5,769.50
Santa Cruz fire station	3,375.34	2,551.59
Anda street market	10,798.40	
Divisoria market	12,825,87	
Quinta market	12,382.68	
Santalon road	415.58	
Luneta sea wall	1,487.05	
Purchases of horses, wagons, etc	45,553.21	
Luneta settees	1,500,00	
Purchase of scows	4,598.93	
Herran street market	1,106.76	
City pound	4,000.00	
Arranque market repairs	3,000.00	
Paco police station	2,450.00	
Burial of pauper dead	26.43	633.31
Per diem allowance, city engineer	170.00	728.50
Removing rock crusher		8,057.71
Petroleum for lights, public buildings		523.47
Total	697,145.76	255,520.36

DEPARTMENT OF ENGINEERING AND PUBLIC WORKS.

[Under the charge of Mr. C. W. MEAD, city engineer, from August 7, 1901, to March, 1902; of Mr. R. C. WHEELER, first assistant, from March to May 26, 1902, and of Captain MCGREGOR, Corps of Engineers, since that date.]

The work of this department of the city government is subdivided as follows: Water supply and sewers, street construction and repair, street cleaning and care of parks, buildings and illumination.

Under the provost-marshal-general the above branches were separate departments, each having its own records. The city charter consolidates these branches under the department of engineering and public works, under the city engineer.

These offices maintained separate records and kept separate accounts up to June 1, 1902, at which time they were consolidated into one administrative office. Mr. Claude Lindsey, formerly chief clerk in the office of "streets, parks, bridges, docks, and wharves," was appointed chief clerk in the department of engineering and public works, and Mr. George P. Nieman, formerly clerk in charge of property in the office of streets, parks, bridges, docks, and wharves, was appointed property clerk in this department.

The above arrangement already shows advantages over the old method, in the expediting of work by better access to records, and by relieving the assistant engineers and superintendents of the office administration. The various repair shops and storerooms of the different branches of the department, which were scattered over the city in different localities, are gradually being discontinued and this work concentrated at the site of the new consolidated shops on Arroceros street.

When this is accomplished all repairs will be made under efficient supervision, waste of material reduced to a minimum, and a material reduction made in the number of requisitions that have been going from this department into the office of the insular purchasing agent.

It may be stated here that owing to certain inherent difficulties the disadvantages to this department of a separate purchasing department have far outweighed the advantages. While the 10 per centum does not, all things considered, cover the cost to the purchasing department of delivery of supplies to the city, the uniform distribution of this cost is unjust in some works—for example, while it is a saving to the water supply in the matter of hauling coal, it is an extra burden on the work of every other branch of this department. In addition to the above much delay and expense is often caused in repair work by being obliged to suspend work for several days or longer until articles can be purchased through the proper department.

It is recommended that the city be granted authority to purchase direct, under the charter restrictions as to contracts, such supplies as can be purchased in the city, or at least to an amount per month to cover emergencies.

STREET BUILDING AND REPAIR.

[Mr. J. L. MUDGE, superintendent, in charge until April 20, 1902; Mr. J. C. MEHAN, assistant superintendent, until July 1, 1902; CHARLES H. FARNHAM, assistant engineer, in charge since that date.]

For purposes of administration in street work, the city is divided into six districts, as follows: 1, Intramuros; 2, San Nicolas; 3, Tondo; 4, Santa Cruz and Quiapo; 5, San Miguel and Sampaloc; 6, Ermita and Malate and Paco.

It is estimated that the city has some 140 kilometers of streets. With the exception of a few of the business streets, which are paved with granite blocks, and streets in the outlying districts, which are unimproved, they are all constructed of macadam.

The city quarry at Binangonan has not furnished sufficient stone for the work, and the supply has been supplemented by a contract for hand-broken stone. This stone is not of uniform quality, being taken from where the native laborer can get it easiest, usually along the shores of the Laguna, and the results of the work are correspondingly unsatisfactory.

A new quarry site has been selected on the island of Talim, a larger crusher, with a capacity of 40 cubic meters per hour, has been ordered, and it is expected the plant will be in working order by October 1, or before. This will give the city a better and uniform class of material, and also furnish a good quality of screenings to replace the present poor quality of river gravel used for surfacing.

In addition to current repairs, the following construction and reconstruction has been accomplished with the limited funds and transportation facilities available: Calle Cervantes (rebuilt) from Calle Bilibid to La Loma Cemetery, 4 kilometers;

Santa Mesa road (rebuilt) from San Juan Bridge toward the city, 1.2 kilometers; new street from Paco to Pandacan, 0.9 kilometers; Calle Vidal (reconstructed), including approaches to Santa Cruz Bridge, 1.73 kilometers; total area repaired and reconstructed, 369,332 square meters.

The rebuilding of the road along the southern boundary of the city, between Manila and Pasay, has recently been undertaken.

The old open drains and curbs of soft Guadaloupe stone are being replaced as fast as time and funds will permit, with cement drain-pipes and gutters and cement curbs. Most of the old gutters have, through settling or other causes, lost all of the slope they originally had. Many of them were laid without reference to slope, especially in the lower portions of the city, and the water, contaminated by discharge from the house drains, stands continuously in these drains in many streets during the year, being especially offensive and dangerous during the dry season.

A direct relation is easily traceable between the existence of these open side drains and the frequency of cholera cases in many dirtricts.

During the year the following quantities of gutters, pipes, and curbs were laid: Pipes, 20 to 30 centimeters, 1,743 meters; gutters, 30 to 40 centimeters, 935 meters; curbing, 750 meters.

In many cases it is found that closed street drains have been made the outlet for house sewers, and in some cases this has been attempted recently, without authority. This is no longer permitted, and whenever the condition is found, other disposal of the sewage is provided as soon as practicable.

The small bridges over the esteros, 45 in number, have been kept in repair by the street force.

Road material used: Broken stone, 31,257.58 cubic meters; gravel, 9,774.24 cubic meters; old material, 2,239.18 cubic meters.

Area repaired and rebuilt, 359,331.85 square meters.

Average daily transportation: Wagons, 14; carts, 12.

Average daily labor: Supervisory, 31; ordinary, 510.

STREET CLEANING AND DISPOSAL OF REFUSE.

[Mr. J. C. MEHAN, assistant superintendent, in charge.]

This work, notwithstanding many difficulties, is steadily improving. Owing partly to lack of transportation and partly to the fact that this branch of the city work has not been given its proper place in the organization of the department, the refuse from street cleaning and that obtained by collection of house garbage have never been separated.

For such as is taken to sea this makes no material difference; but with the existing system of disposal only about 21 per cent is taken to sea, 19 per cent being cremated, and about 60 per cent (garbage and street sweepings) dumped in low places in the suburbs.

The city possesses at present two crematories, crude affairs, and expensive to operate. They handle about 45 tons of refuse, their capacity being materially lessened by the presence of the street sweepings, which clog the grates and cut down the consumption generally.

Contract has been let (July 10, 1902) for a crematory to be furnished from the United States with a capacity of 3,000 tons per month, which will, it is thought, be ready in one year's time. Present indications are that with a proper separation of refuse there would be some 2,000 tons per month that should be cremated.

As before stated, about 21 per cent of the refuse now collected is sent to sea. The present plan consists of a dumping board at the Maestranza wharf and two scows. They are towed to sea by the department launch, which also tows stone from the quarry on the Laguna. The scows are about 12 years old, and should be supplemented by additional scows before they fail entirely. Three additional scows and a separate launch are needed for this work.

The dumps in the suburbs have been complained of in some instances by the board of health. They are considered especially dangerous during the present cholera epidemic. Every effort within the means at hand is made to keep them covered with earth or sand as far as possible, but they are objectionable.

All principal streets in the city have been cleaned twice, and some three and four times daily. On many of the streets the work is greatly increased, especially in the suburbs, by the fact that the citizens do not comply with the ordinance relative to placing house garbage and refuse in cans. Often it is thrown directly on the streets, day or night, as is most convenient.

The disposition of the material by districts is as follows:

District.	Name.	Location of dump.	Disposal.
No. 1	Intramuros	Maestranza wharf	Towed to sea.
No. 2	San Nicolas and Tondo	Calle Sande	Filling.
No. 3	Santa Cruz and Quiapo	Calle Timbugan	Do.
No. 4	San Miguel and Sampaloc	Calle San Rafael	Do.
No. 5	Ermita, Malate, and Paco	Calle Real, Malate	Do.

The district subdivision has been recently continued farther down, making subdistricts under foremen. The use of handcarts in the subdistricts for collection will also increase the efficiency. Much more could be done than at present with the present organization if sufficient transportation were available. With its 140 kilometers of streets to clean and maintain the department of engineering and public works has but 113 head of stock in its stables.

The city has advanced in cleanliness beyond the point where bull carts can be used advantageously except in the suburbs.

The following table shows the quantity of different classes of work performed:

Average daily labor:		
Ordinary	days	447
Supervisor	do	33
Total area cleaned	square meters	885,933,682
Cost cleaning	per square meter	$0.066
Cost carting	do	$0.095
Refuse hauled	loads	134,548
Disposal of as follows:		
Cremated	do	28,056
Taken to sea	do	25,395
Dumped in suburbs	do	81,097
Animals, etc., cremated:		
American horses and mules	number	1,271
Native	do	2,018
Carabaos	do	495
Cows	do	455
Dogs	do	199
Fowls	do	2,522
Pigs	do	51
Cats	do	80
Rats	do	30,192
Total		37,283
Total area streets sprinkled	square meters	348,522,148
Cost of sprinkling 1,000 square meters		$0.062
Average daily transportation:		
Department wagons		12
Department carts		20
Bull carts		84

PARKS.

The present park area of the city, improved and unimproved, is:

Name.	Square meters.	Condition.
Ermita Park	536	Unimproved.
Plaza McKinley	4,222	Improved.
Plaza de Garcia	516	Unimproved.
Luneta	21,920	Improved.
San Sebastian	495	Unimproved.
Plaza de Calderon	4,199	Improved since August 7.
Plaza Santo Tomas	1,105	Unimproved.
Plaza San Gabriel	407	Improved since August 7.
Plaza de San Juan de Letran	237	Do.
Plaza Sampluacan	675	Do.
Plaza Malate	767	Unimproved.
Botanical gardens	47,000	Partly improved.
Total	82,079	

The total amount available for the year for care and improvement has been $12,420.

All of the park area has been kept clean and in good condition; in the improved parks careful attention has been given to resodding worn places, to more thorough sprinkling of driveways, and cutting dead branches from trees, besides many smaller details.

Watering all parks during the dry season was done at night, and much attention was given to the watering of trees along many of the drives. The beneficial effect was readily seen in the appearance of the foliage during the latter part of the dry season.

The Luneta especially has required constant attention to sustain the wear incident to its daily use by thousands of people. The footpaths are not entirely satisfactory, owing to the class of material used in their manufacture. An effort will be made to correct this, and also some trees will be placed in this park as soon as the wet season will admit of safely moving trees of sufficient size.

As soon as funds will admit the ground in the unimproved portion of the botanical garden should be raised. The ground is too low to admit of draining, and the raised walks cause water to stand in many places throughout the rainy season. This park can be made one of the most attractive spots in the city.

The following summary shows the total labor performed during the year on care and improvement of parks:

Ordinary labor	days	36, 162
Superintendence	do	3, 312
Total area cleaned	square meters	38, 185, 920
Total area moved	do	980, 292
Total area graded and sodded	do	11, 530
Total area walks repaired	do	24, 000
Drains laid	meters	380
Average daily transportation:		
Mule carts		4
Bull carts		10

In addition to the regular city-park work, the grounds of the Malacañan Palace have been improved by the regular park force. The lawns were graded and sodded, the walks raised and rebuilt, storm drains laid, etc. Much remains to be done at the eastern end, where filling is needed. The total cost of this work, which is included in the total expenditure for park work above, was:

Material	$1, 910. 00
Labor	1, 849. 00
Transportation	439. 44
Total	**4, 198. 44**

CEMETERIES.

This department has had charge of the care and maintenance of the Paco and La Loma cemeteries since April 1, 1902. The first-named cemetery has a system of vaults, or niches, in which the bodies are walled up, and where, under the Spanish Government, they remained for a period of five years, and as much longer as the rental was paid. When the rent ceased the remains were taken out and thrown on a pile in the rear of the cemetery. The practice of emptying the niches is still continued, but only when it is necessary to provide additional burial space, and instructions have been given to have the exhumed remains cremated. The unsightly pile of bones has been removed.

At La Loma there are no vaults, bodies being buried in the ground.

The number of burials for the three months April 1 is as follows:

Paco	128
La Loma	1, 144
Total	1, 272

The above cemeteries are badly in need of repair. Steps have been taken to renovate them and make what repairs are necessary.

CARE OF PUBLIC AND RENTED BUILDINGS AND ILLUMINATION.

[Mr. L. A. DORRINGTON, superintendent in charge.]

There are at present rented by the city the following buildings for public purposes:

For school purposes	23
For police	10
For morgue	1
For superintendents of cemeteries	2

Two pieces of land are rented for market purposes and one for a crematory.

During the year leases have been made for the following buildings:

Schoolhouses	4
Police stations	2
Storehouse	1

During the year the following rented buildings have been vacated and the leases canceled:

School buildings	10
Police stations	15
Morgue	1
Storehouse	1

All public and rented buildings used by the city have been daily cleaned and cared for. Their general sanitary condition has been very good. The following minor repairs have been made:

City Hall.—One case for shelves, 5 tables, 8 benches, 2 large partitions, 5 large bookshelves, 2 cases of 5 drawers each, a pay counter, 1 bulletin board, 1 measuring stand, and an easel for large map of city, manufactured. Two large bookcases altered and repaired.

Matadero.—Superintendent's quarters were overhauled and repaired, re-covered with cloth inside, and painted inside and outside. Crematory was temporarily repaired.

Quiapo Girls' School.—Cut two openings in corner of building and built awnings over them. Cut hole in ceiling of one room to ventilate building. Cemented floor and outside of water-closet and repaired two faucets.

Quiapo Boys' School.—Cemented floor of water-closet.

Quinta Market.—Constructed roof to quarters of superintendent.

Malate native police station.—Repaired walls and cornice over door in main entrance. Tore out old board floor in one room and tile floor in water-closet, repairing same with new boards.

Postigo Prison.—Built 4 cells and made miscellaneous repairs to 6 doors and to sewers. Secured with wood and fenced in 15 windows with barbed wire.

Santa Cruz fire station.—Altered 3 windows in the quarters of the chief from swinging to sliding ones.

Asuncion police station.—Wainscoted and covered with cloth all rooms and installed 2 faucets in bathroom on second floor. Overhauled and repaired iron roof. Tore up and relaid stone floor in courtyard. On first floor repaired floor of water-closet and tore up entire unserviceable floor of tiling and wood, replacing same with rough board floor. The entire building, interior and exterior, was painted, and the building is now used as a school for Chinese children.

Calle Victoria Normal School.—Partitioned entrance to closet and put in a double door, changed positions of 2 wash basins and 2 urinals. Made separate entrance to closet by cutting door in hall way. Replaced with new old and unserviceable hinges and lock on door in main entrance.

San Fernando police station.—Tore down old board shed and rebuilt same, putting on iron roof. Concreted and cemented floor 40 by 6 feet in rear of building. Repaired in places, with cement, the wall around the building, built and placed in service 1 telephone booth. Took iron roof off dining room, repaired and placed same and enlarged room 4 feet, took out wood floor in 2 cells and cemented same, also side entrance to building. Patched masonry in 2 rooms and wainscoted and covered with cloth all rooms on second floor.

Anloague building.—(Police station and internal-revenue office.) Overhauled and repaired roof of entire building. Built stairway up from kitchen to police quarters. Removed partitions from police quarters to internal-revenue office. Built sink in kitchen upstairs, lining same with tin, and connected it with sewer; also connected kitchen downstairs with 50 feet of water pipe, installing one faucet; installed three flush closets, one large and two small urinals; boarded up three arches to partition off dining room. Tore out wood floor in water-closet and cemented same; built three cells with board floors and boarded floor of passage leading to them. Tore out old kitchen and fitted same for use as a bathroom. Secured six windows of former cells. Placed in police office a railing, a platform for sergeant's desk, two swing-screen doors, and made door of a window. Replaced with new all old and unserviceable locks in doors of internal-revenue office. Repaired floor in portion of building occupied by the license department.

Samaploc mounted police station.—Built mangers for 10 horses.

Ermita police station.—Built storeroom under stairway and improved two cells by placing ceiling in them.

Parian police station.—Entire building was overhauled and repaired, two additional water-closets were placed in service, and building painted throughout. Five cells were built and a flagstaff erected. In court room built and installed the following: Judge's bench and platform for same; four benches, 12 feet, with backs and footboards; a 20-foot railing; also a railing, 20 by 8 feet, inclosing prisoner's dock.

Santa Cruz police station.—Built platform, judge's bench, railed off court room, and partitioned off passage from court room leading downstairs.

Sampaloc native police station—Built temporary shed for four horses and patrol wagon.

Sampaloc metropolitan police station.—Closed in sides of shed for use as dining room and kitchen. Built temporary stall for one horse; iron roof from quarters to cells and kitchen and two doors to cells.

Calle Moriones police station.—Built a water-closet and temporary shed for 10 ponies. Placed board floor in one cell.

Paco police station.—Installed water pipes, two faucets, and two shower-bath heads. Built one cell with iron doors and windows and cement floor.

San José Boys' School.—Partitioned with boards one large room.

The Quinta and Divisoria markets were opened in October and November, 1901, respectively, and have been conducted since that time. Of the 28 claims for rental of land used for the old Divisoria Market 23 have been satisfactorily adjusted.

The remaining five are awaiting the arrival of the claimants.

All buildings and encumbrances on the land rented for the Arranque Market extension, that were undesirable, have been removed.

The streets and public buildings of the city are lighted with electricity by a franchise of a private plant, under date of October 8, 1892.

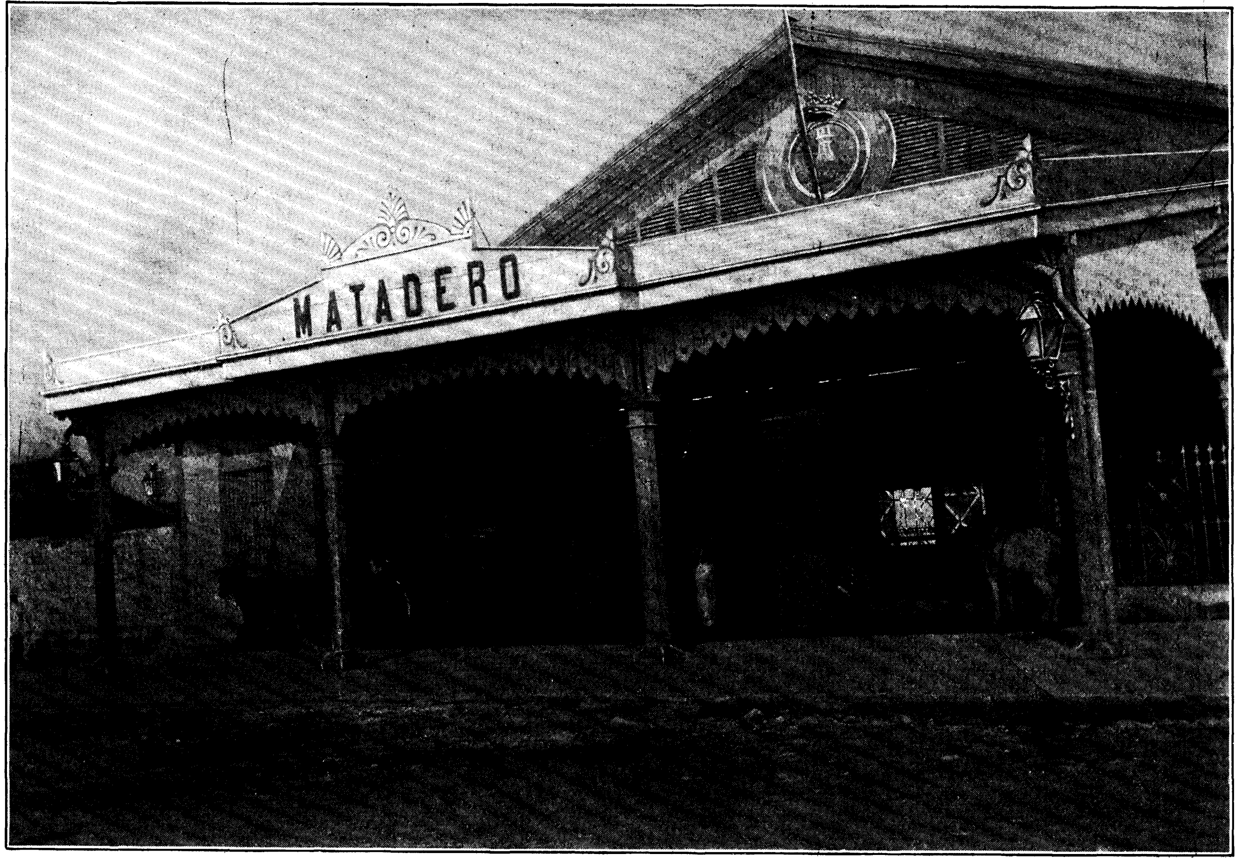
The following are the rates paid annually: 2,000 candlepower (arc), $18, local currency; 1,500 candlepower (arc), $15, local currency; 20 candlepower (incandescent), $2.50, local currency.

During the year three arc lamps on the old Divisoria Market site were discontinued, and 40 arc lamps and 246 incandescent lamps were established, as follows: Quinta Market, 9 arcs and 1 incandescent; Divisoria Market, 100 incandescents; internal-revenue building, 63 incandescents; Santa Cruz Bridge, 4 arcs; Parian police station, 15 incandescents; Paco fire station, 16 incandescents; Asuncion police station, 9 incandescents; city stables, 11 incandescents; native substation Anloague, 5 incandescents; Audiencia building, 12 incandescents; Sampaloc police station, 14 incandescents; Calle Nueva, Ermita, and Malate district, 9 arcs; Calle Nozaleda, Paco, 9 arcs; Calle P. Faura, Paco, and Ermita, 3 arcs; Calle San Luis, Ermita, 1 arc; Calle Arroceros, Ermita, 3 arcs; Calle Concepcion, Paco, 1 arc. The following former installations were remodeled to conform to the Board of Fire Underwriters regulation: 12 incandescents at Audiencia building; entire installations at Parian police station, Quinta Market, Quiapo Girls' School. The positions of three 24-hour circuit incandescents, at the Parian police station, were changed.

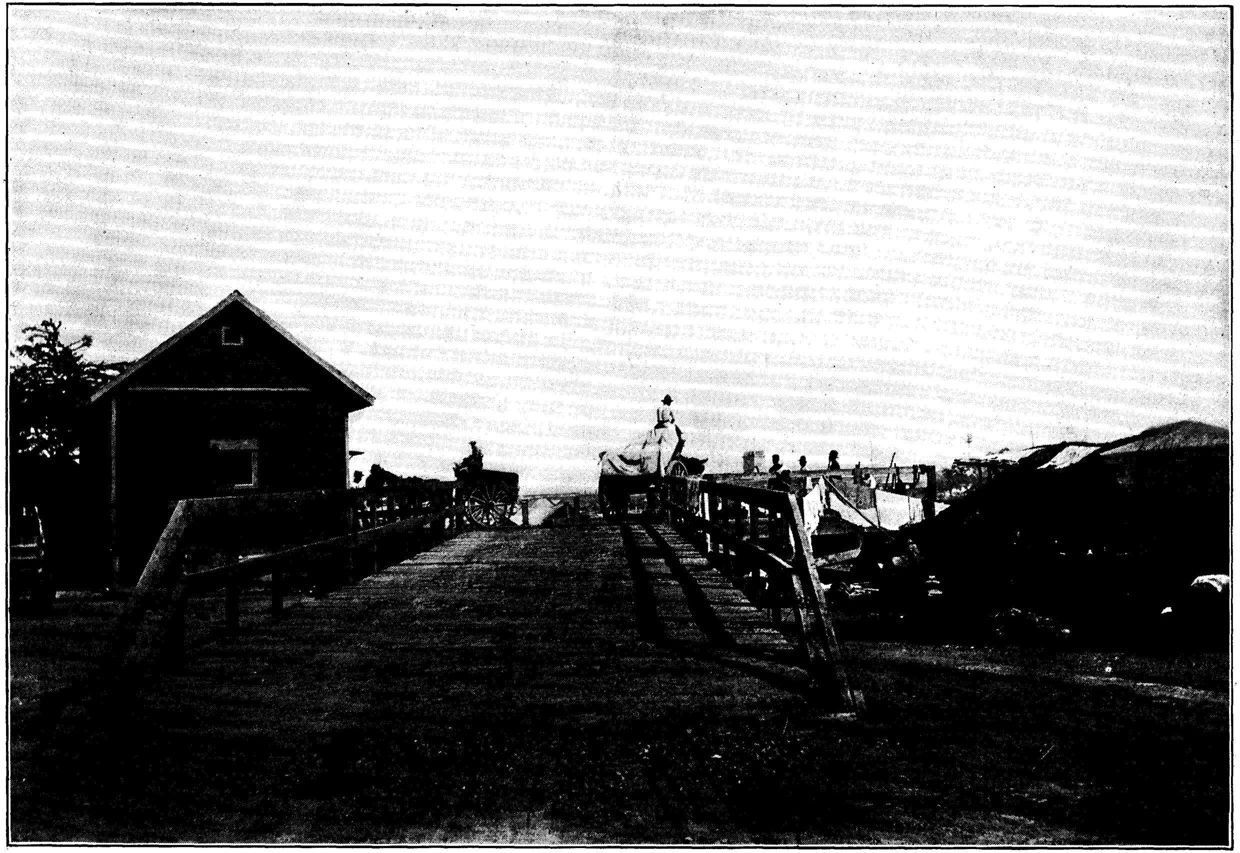
The city has now in operation the following lights on streets and public buildings:

	Candlepower.
209 arc lights	200
9 arc lights	1,500
1,217 incandescent	20
345 incandescent	16
6 incandescent	10
5 fan connections.	

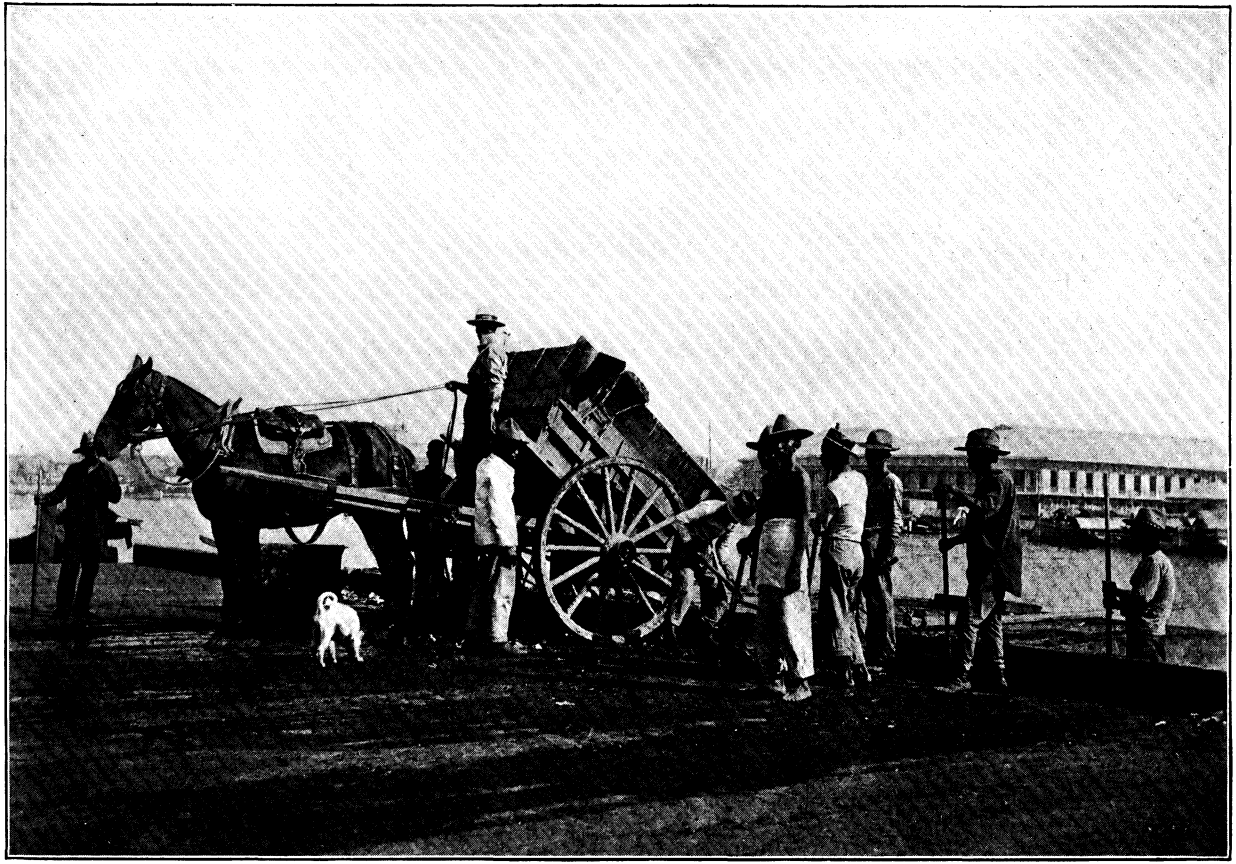
Four telephones have been discontinued and four established. The positions of six telephones were changed for the convenience of the users.



SLAUGHTERHOUSE.

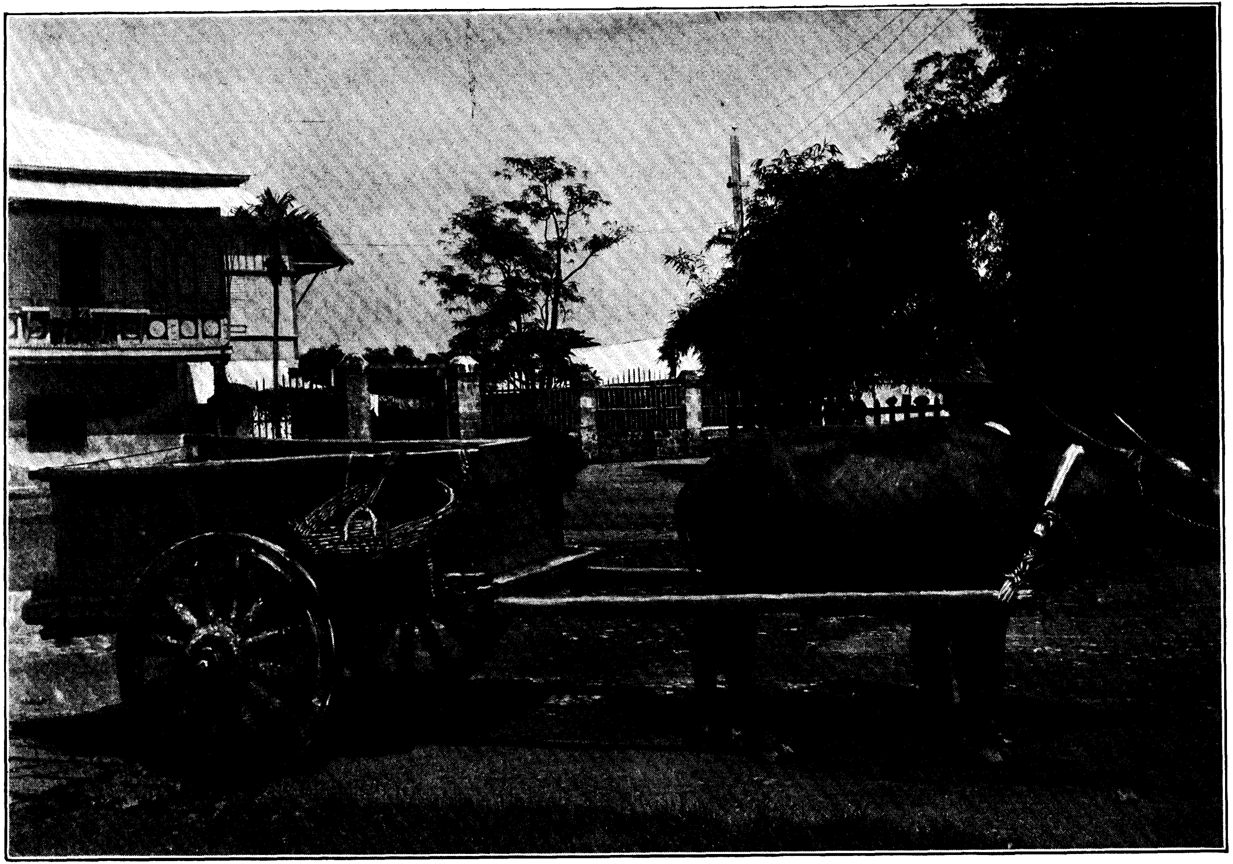


DUMPING BOARD FOR GARBAGE, MAESTRANZA.



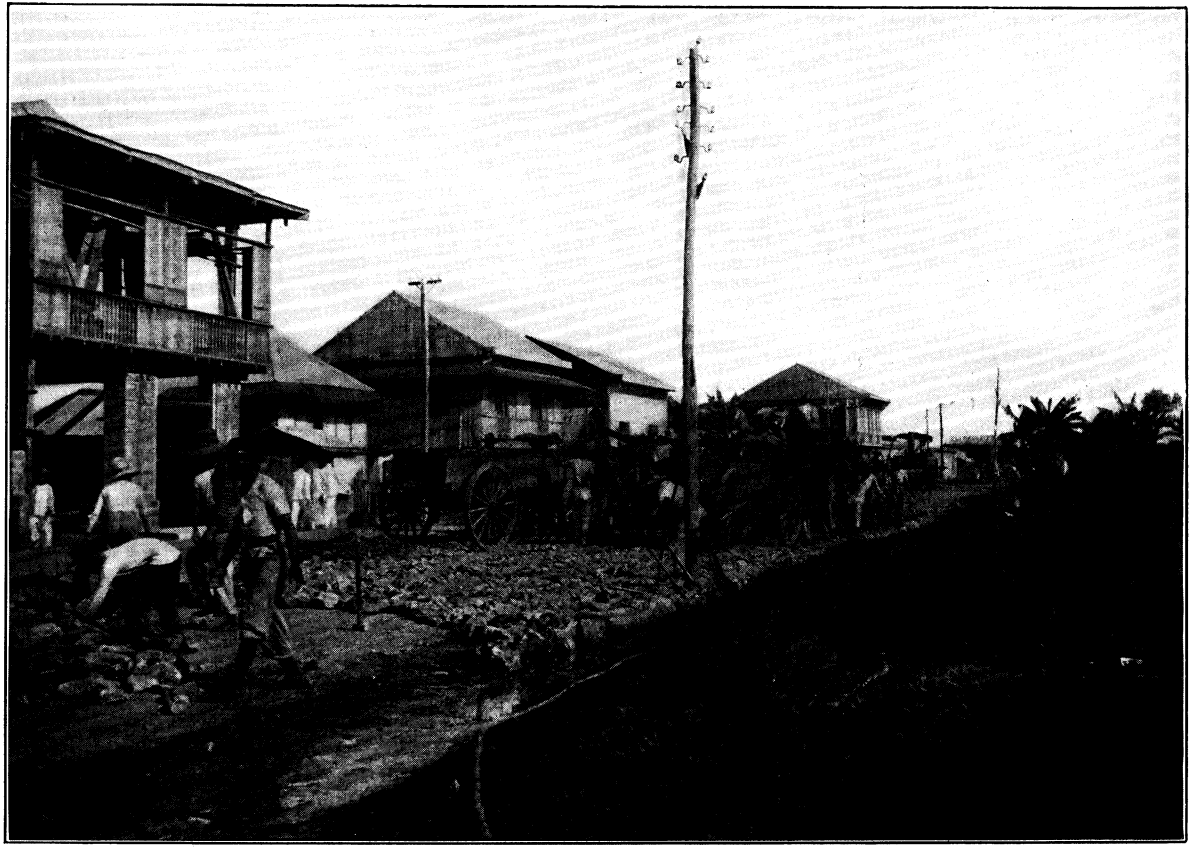
MAESTRANZA DUMPING BOARD ON PASIG RIVER.

American dump carts worked by Filipinos.

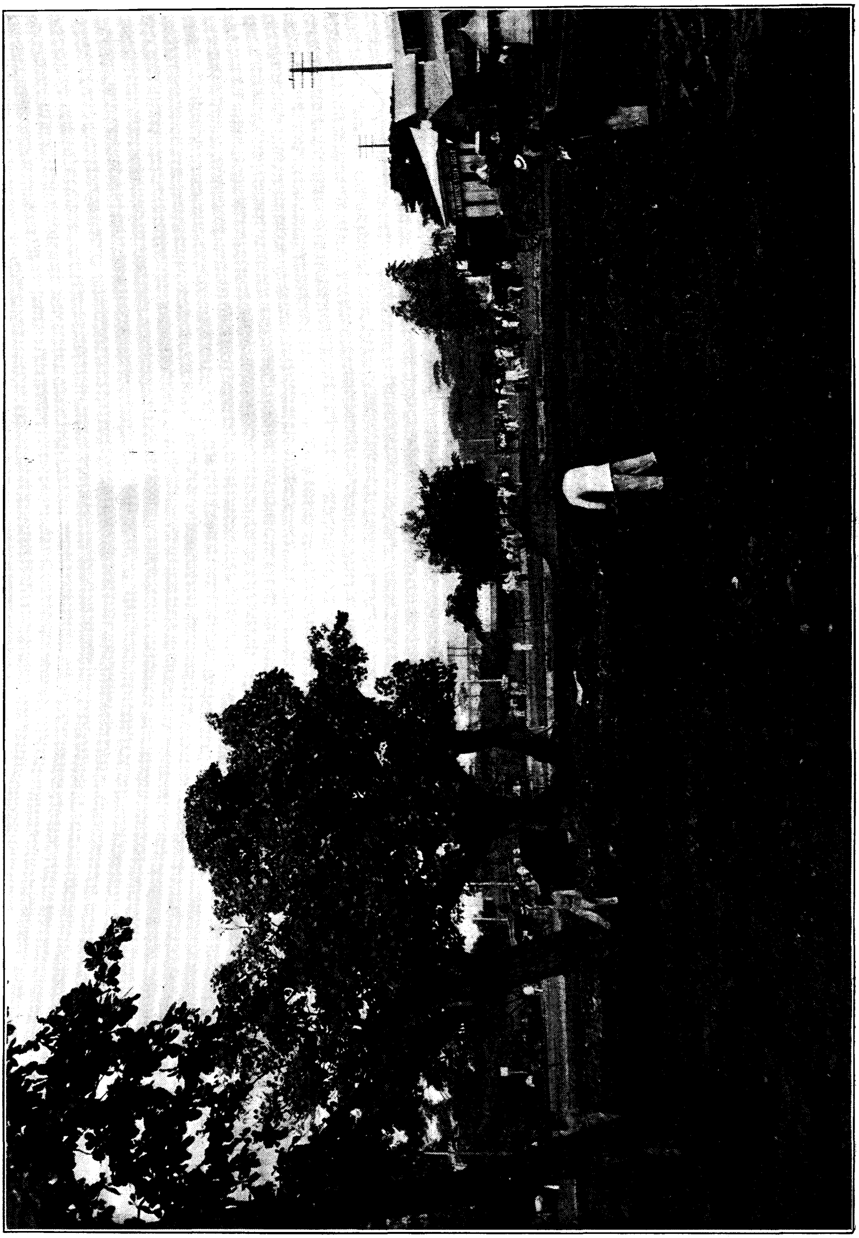


CARABAO CART, DUMP CART USED BY FORMER GOVERNMENT.

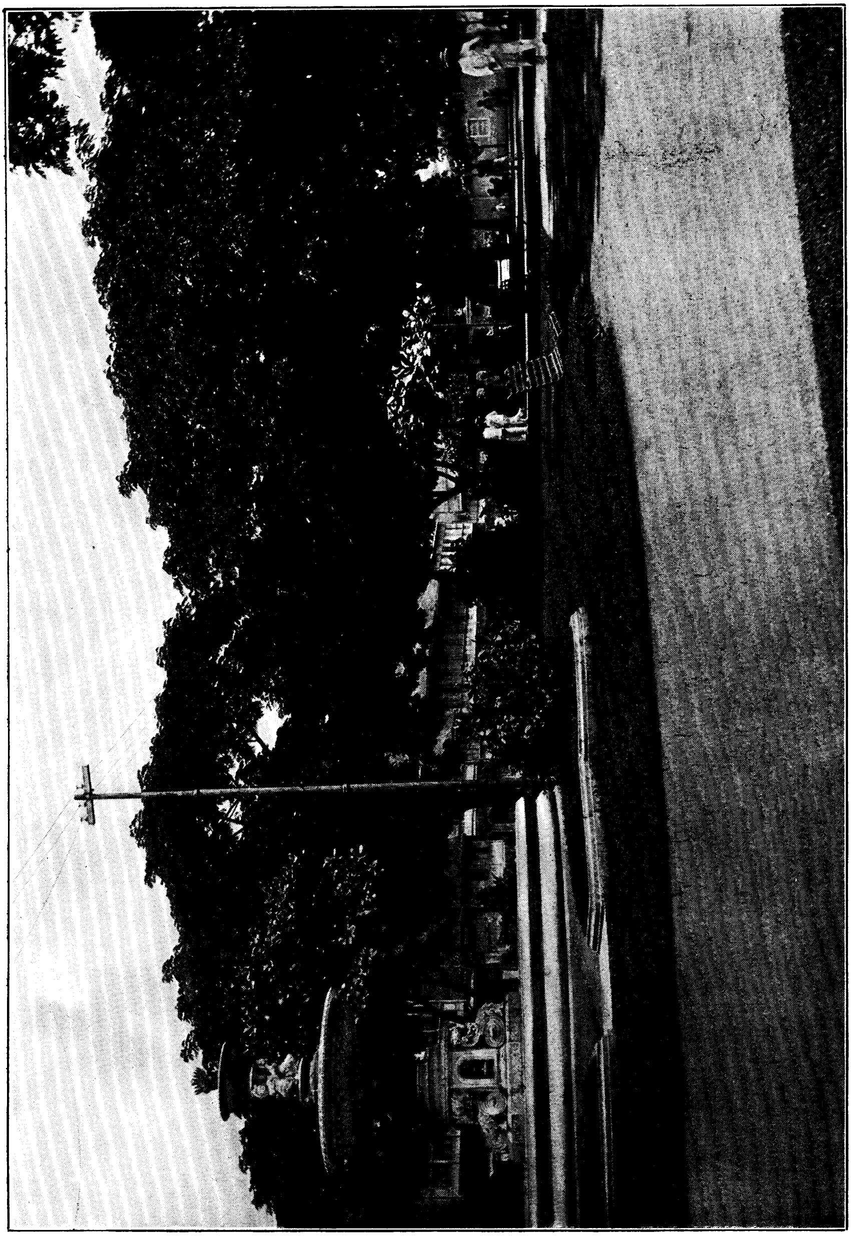
Compare with American cart.



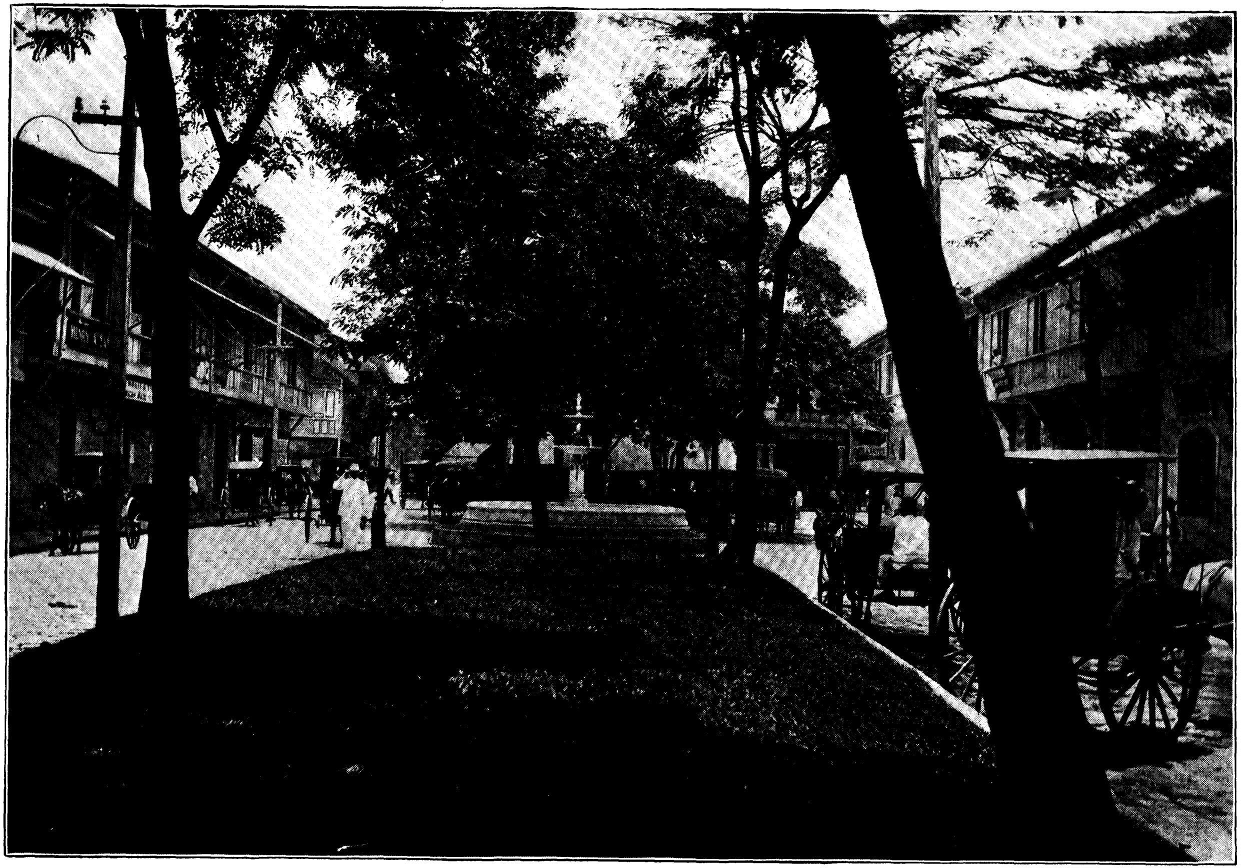
STREET WORK, CARRIED ON BY FILIPINOS UNDER AMERICAN INSPECTORS, SHOWING HEAVY STONES USED IN RAISING THE STREET ABOVE THE LOW GROUND.



IMPROVING PLAZA LAWTON.

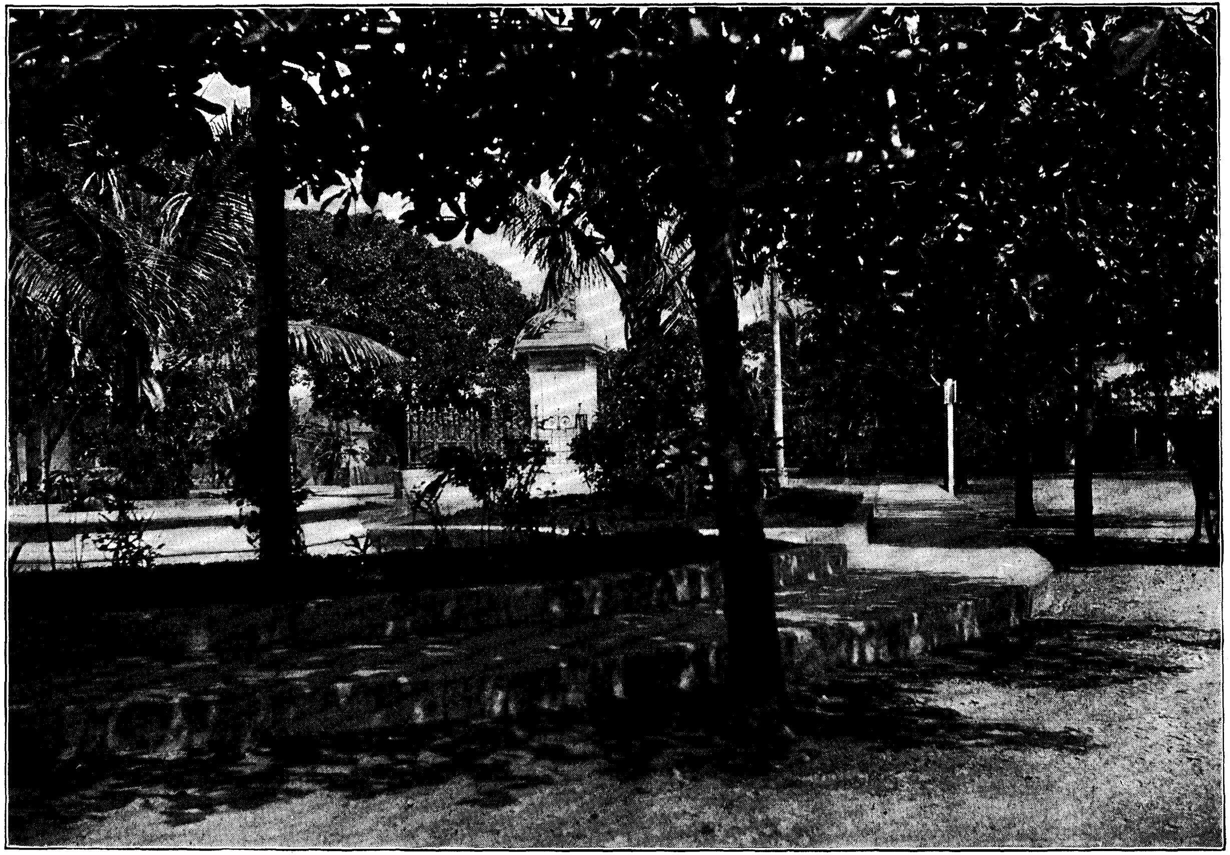


BINONDO PARK—IMPROVED.

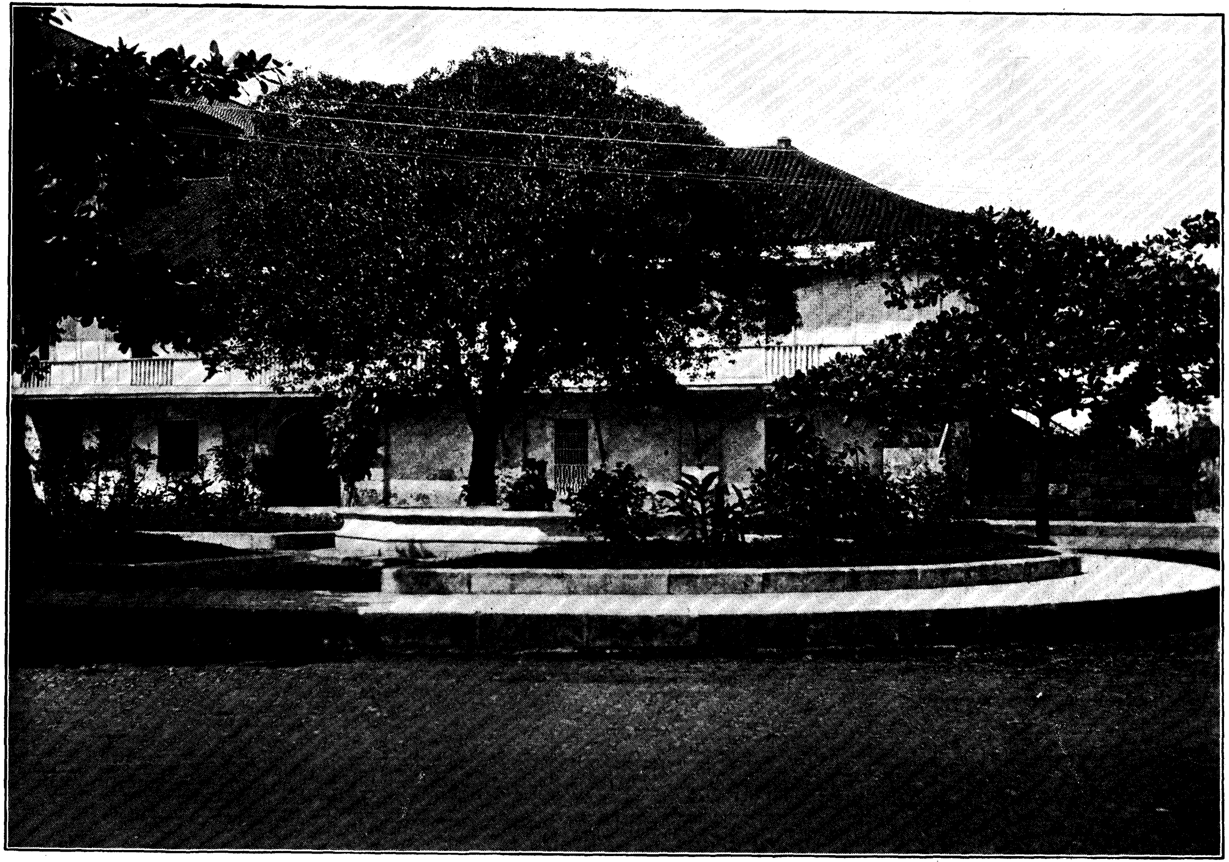


PLAZA CERVANTES.

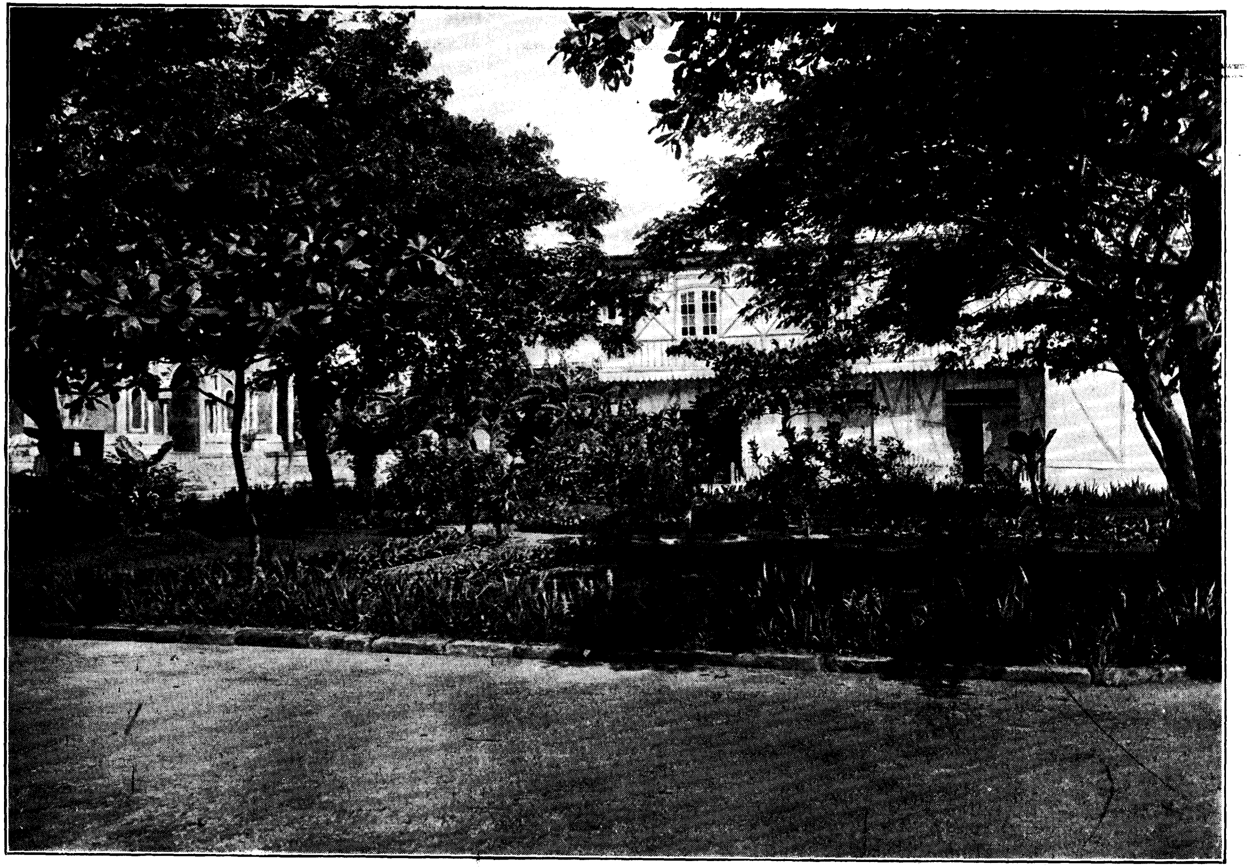
Rebuilt and reduced to accommodate increasing traffic.



STATUE OF ISABELA II, MALATE PLAZA.

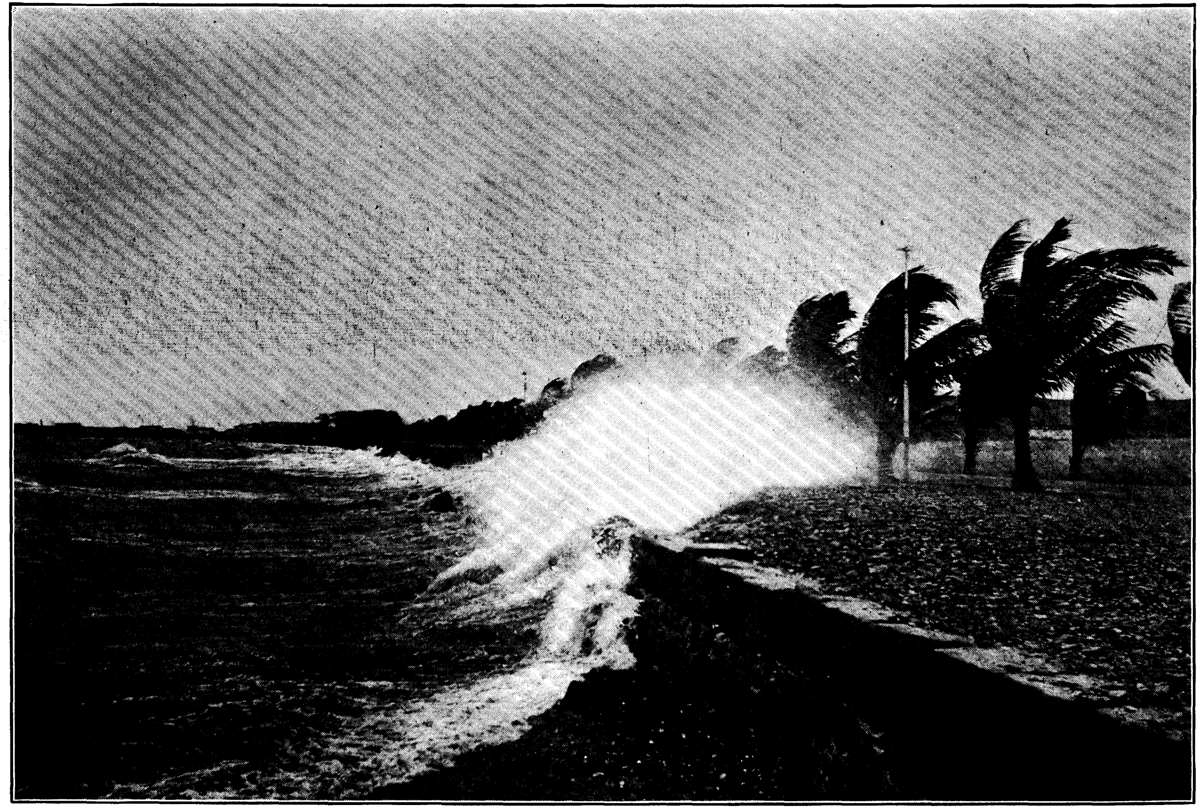


MALATE PLAZA.



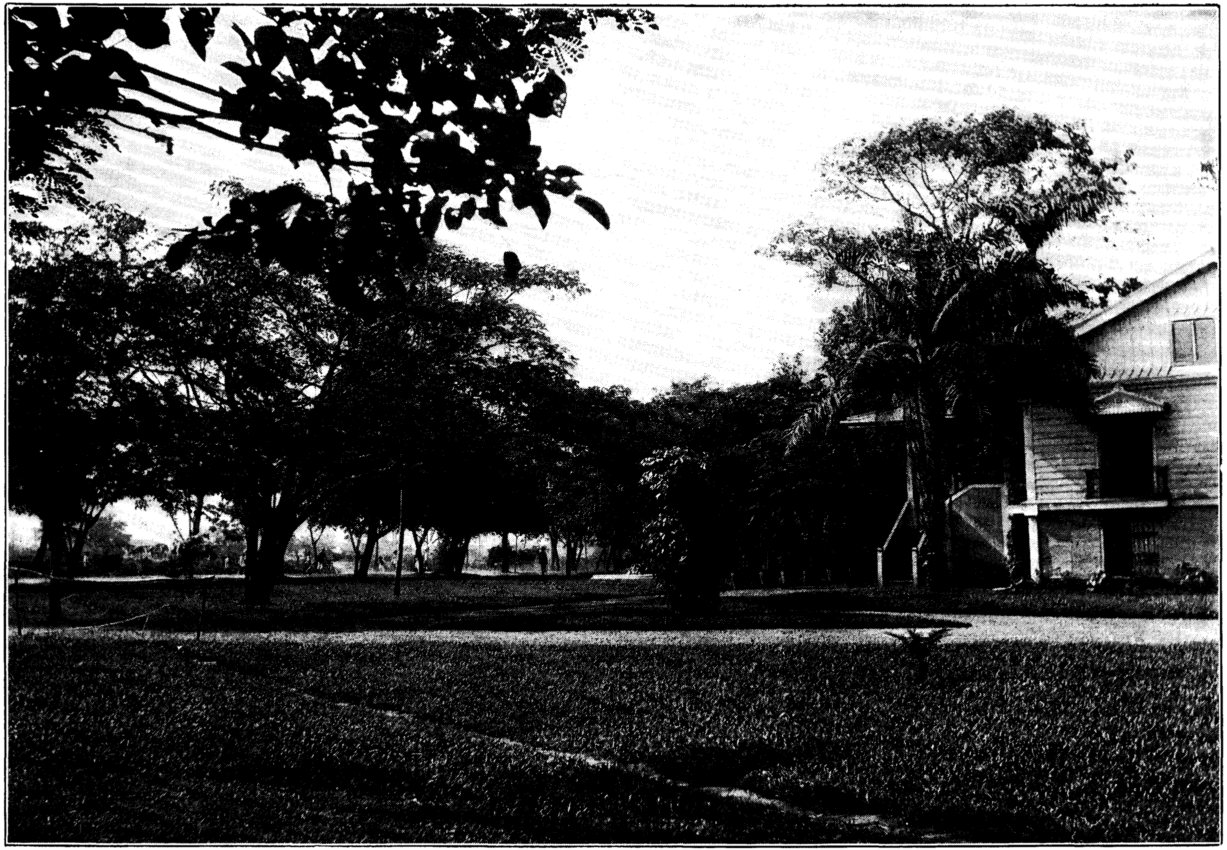
ERMITA PLAZA, PARTLY IMPROVED.

THE MALECON EXTENSION OF LUNETA DRIVEWAY, DURING A TYPHOON, SHOWING BEGINNING OF SOUTHERN WALL OF NEW HARBOR IMPROVEMENTS.

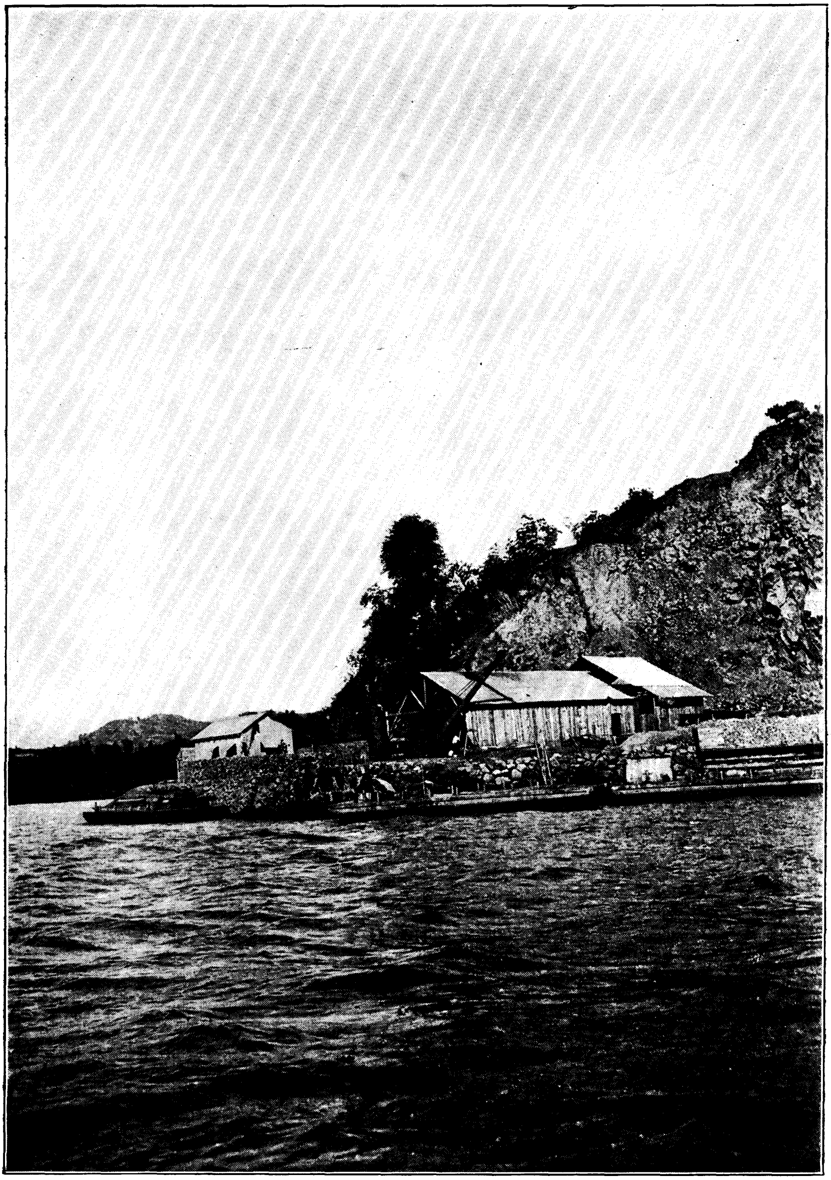


MALECON, BAY FRONT, DURING TYPHOON.

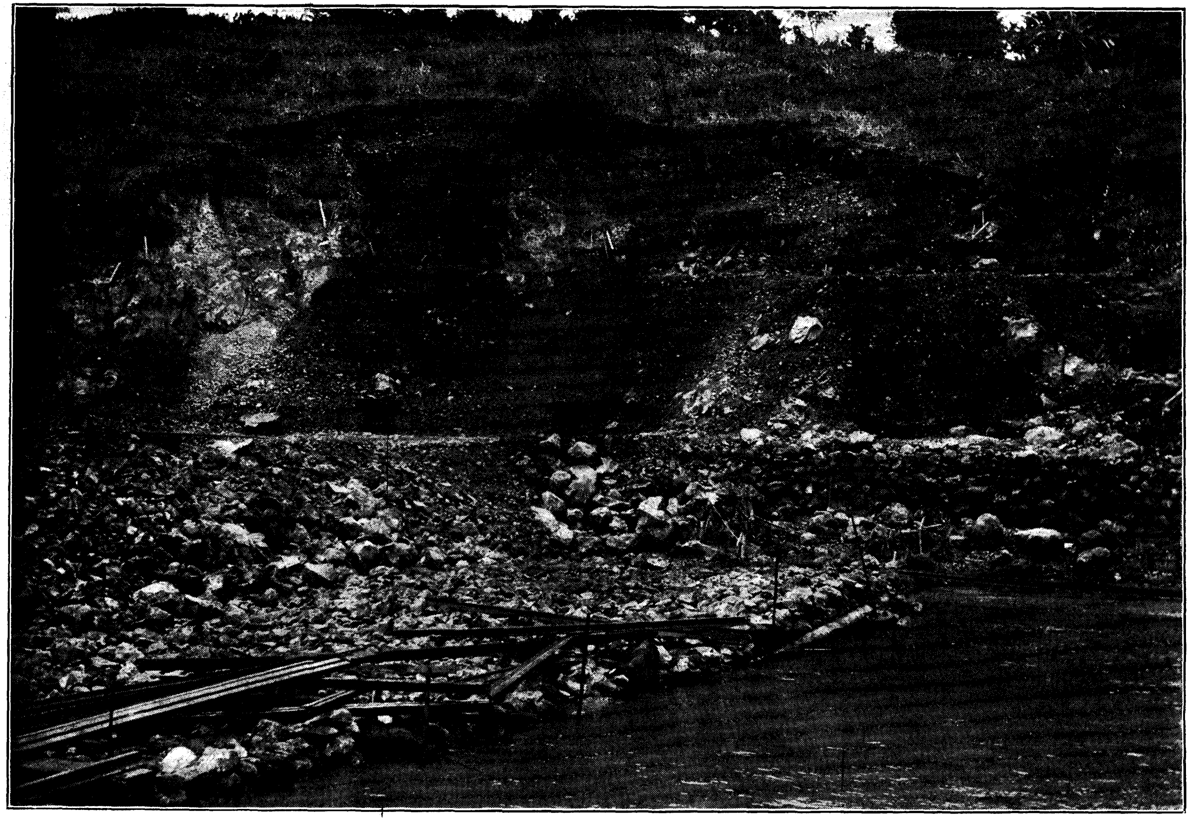
A WALK IN PACO CEMETERY, UNDER CHARGE OF THE CITY.



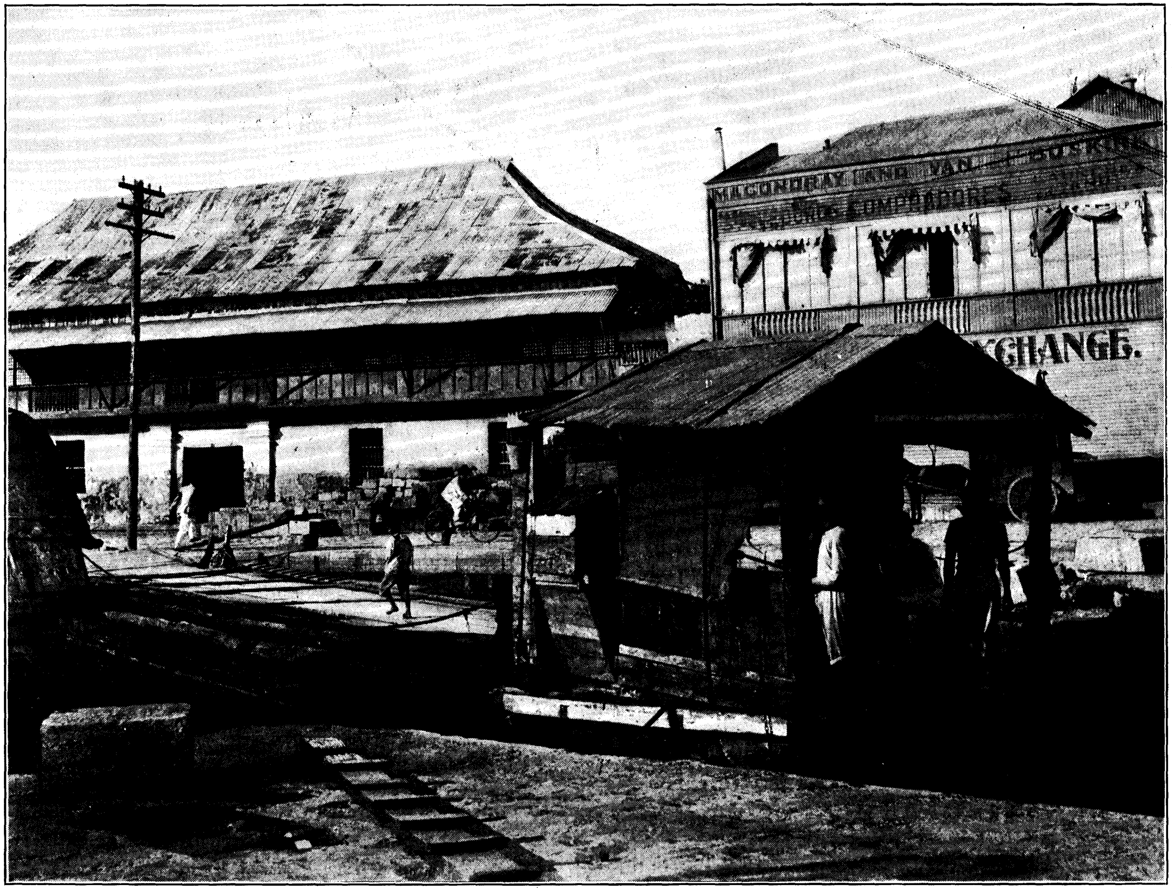
VIEW IN THE BOTANICAL GARDENS, SHOWING HOUSE OF THE CITY ENGINEER.



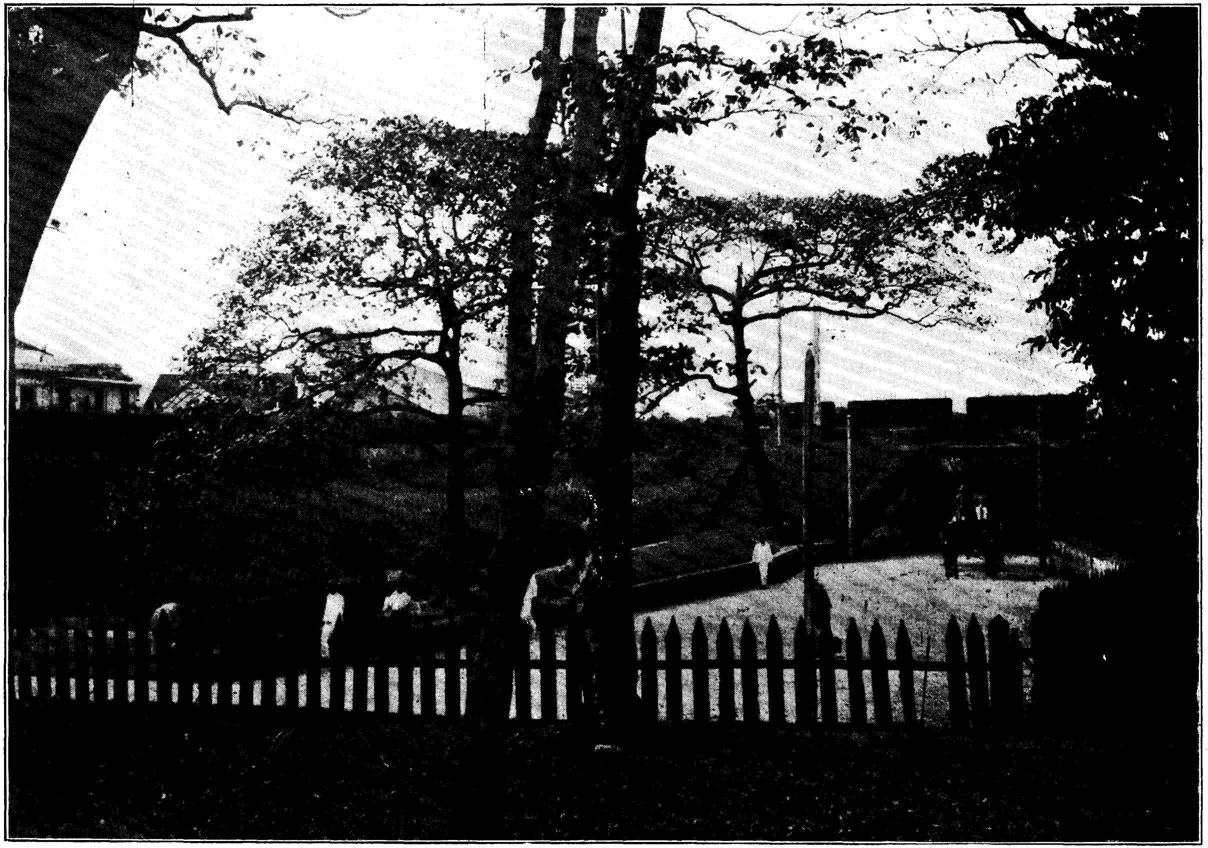
CITY QUARRIES, BINANGONAN.



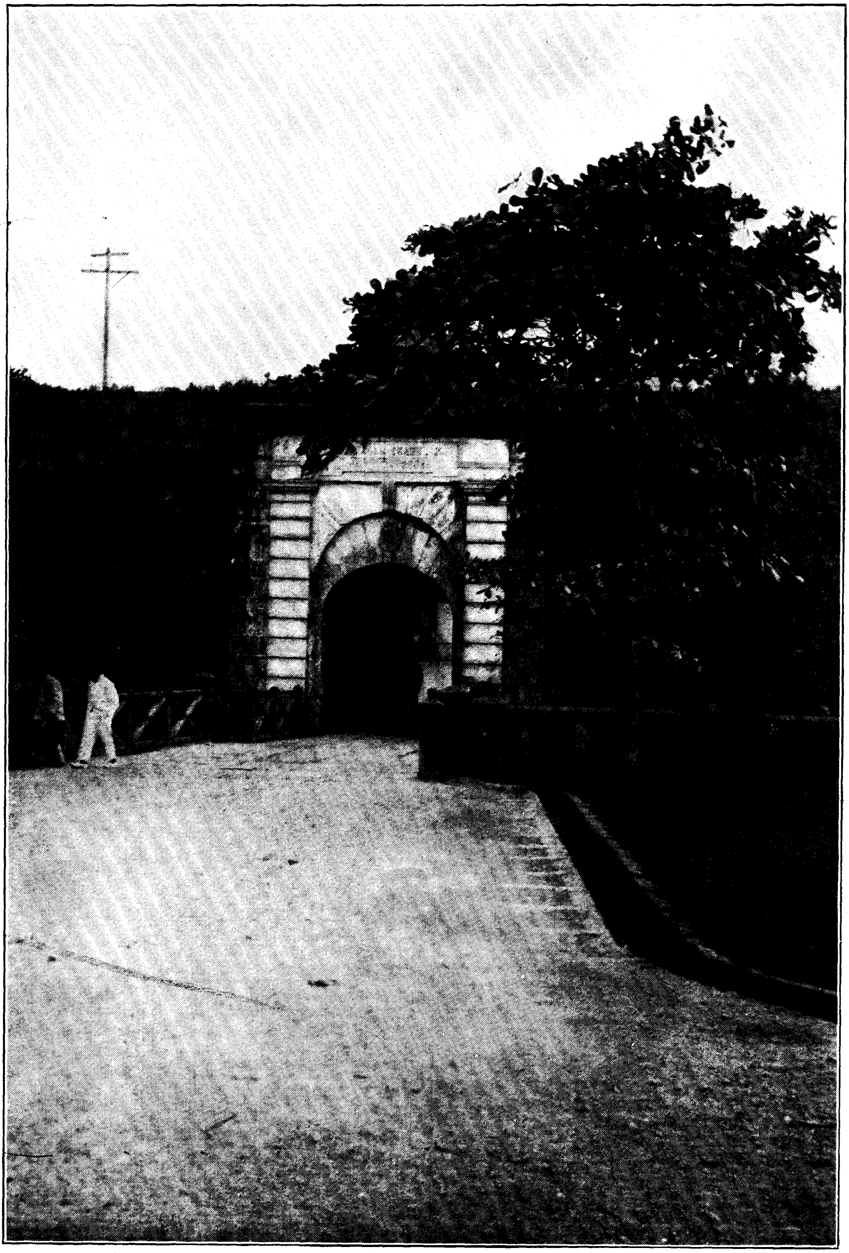
PREPARING SITE FOR NEW QUARRIES, TALIM ISLAND, LAGUNA DE BAY.



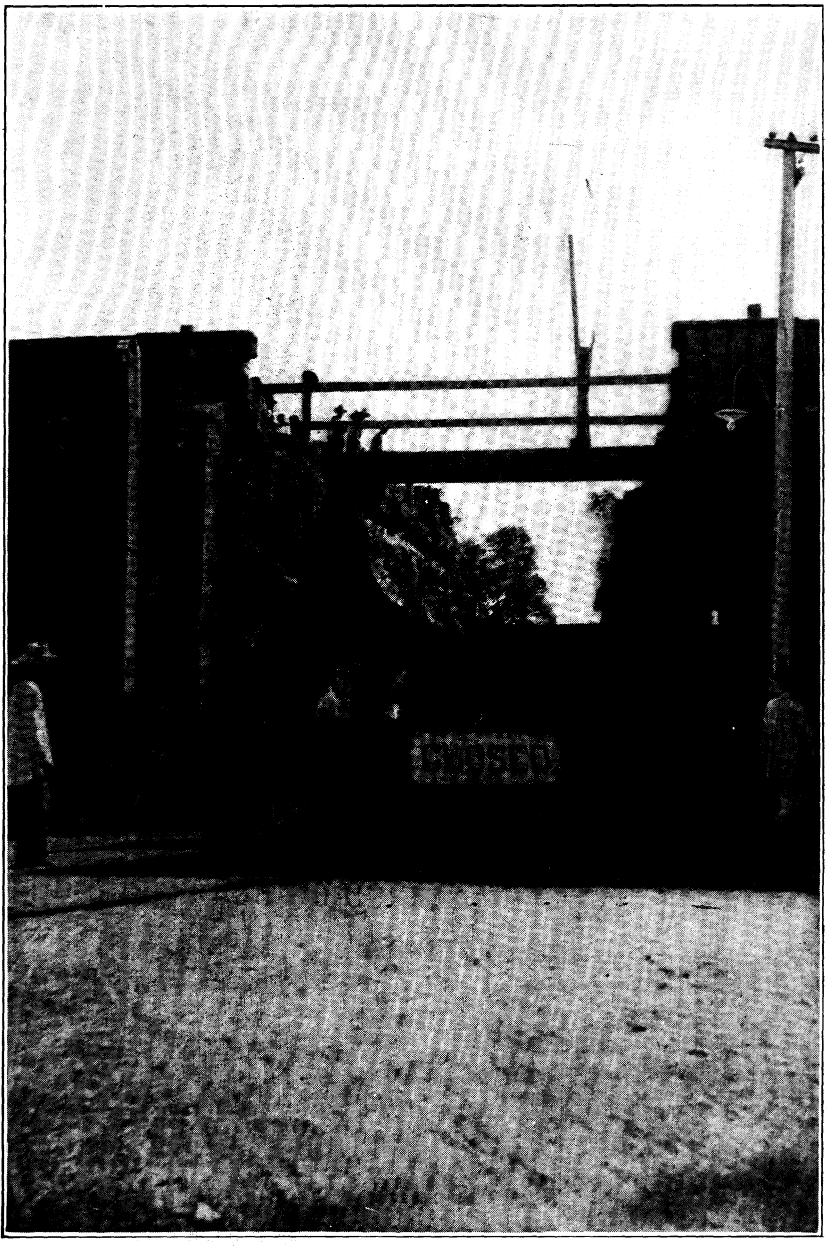
ANCIENT FERRY, BINONDO CANAL.



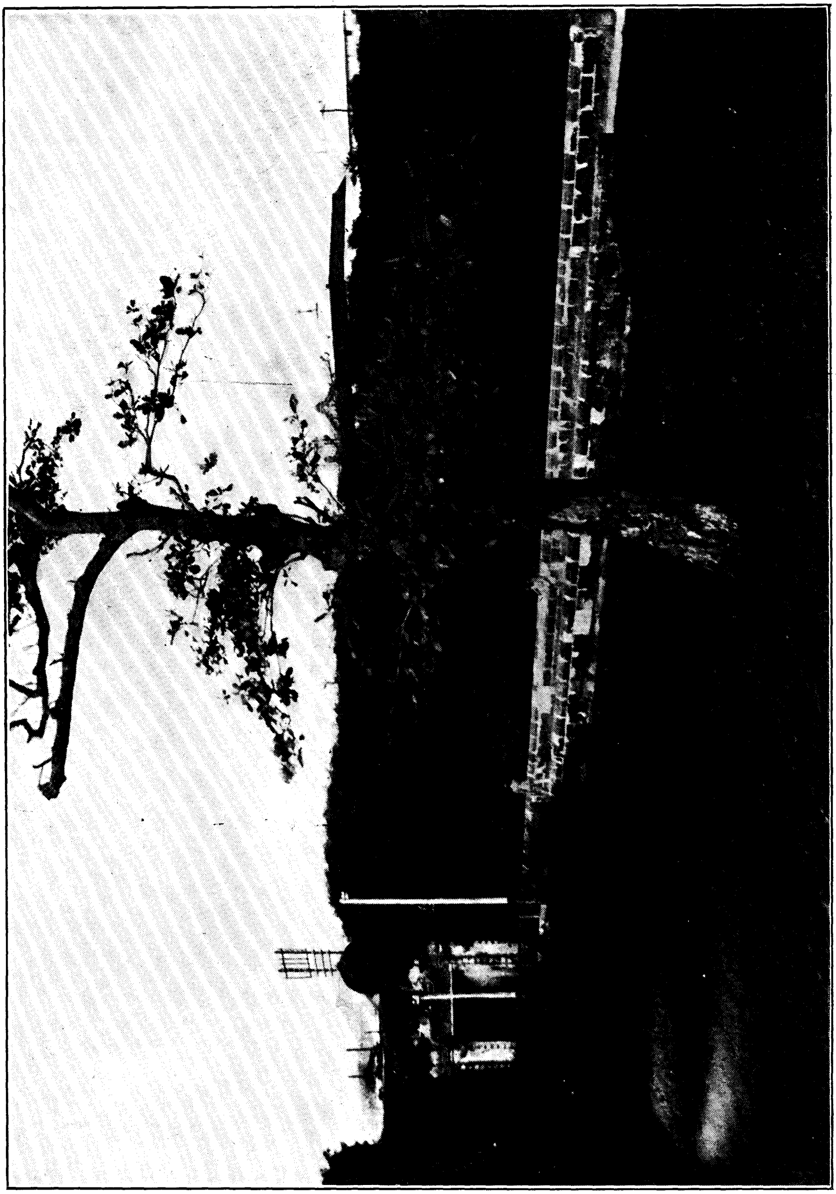
OUTSIDE PARIAN GATE.



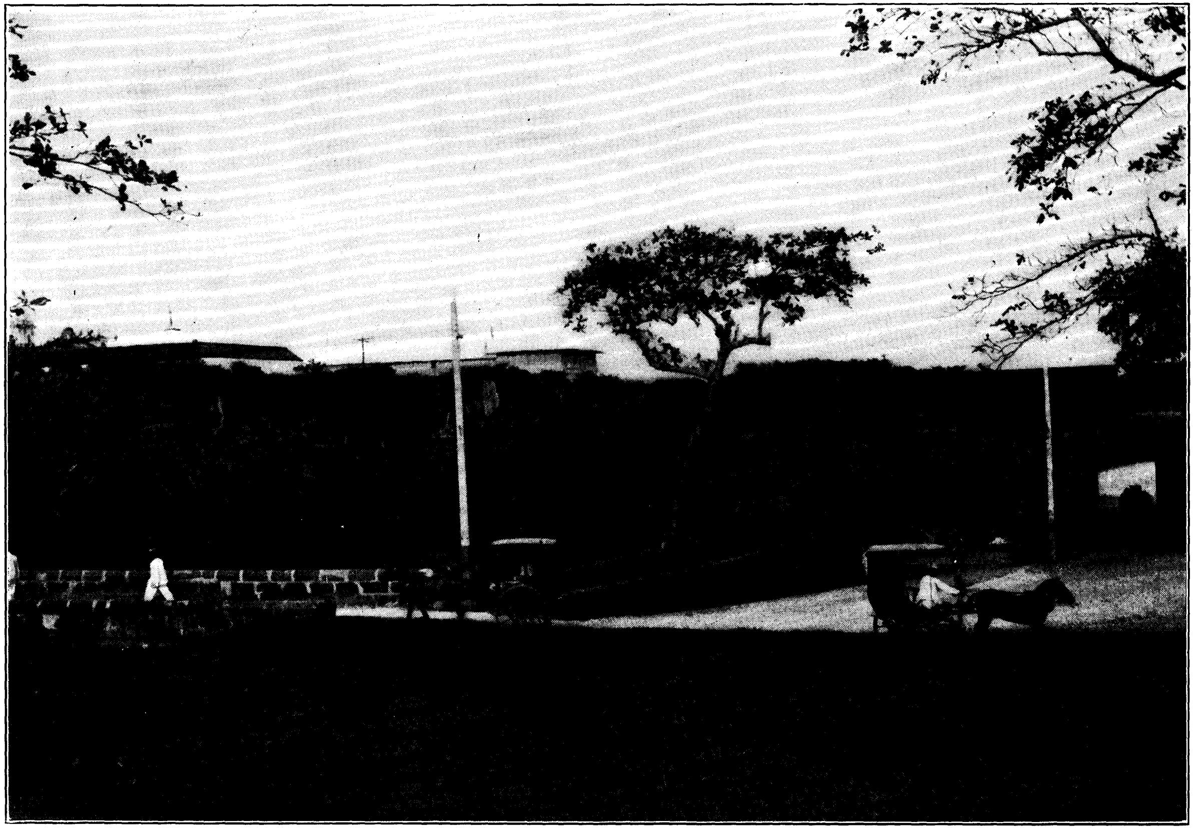
ISABELA II GATE.



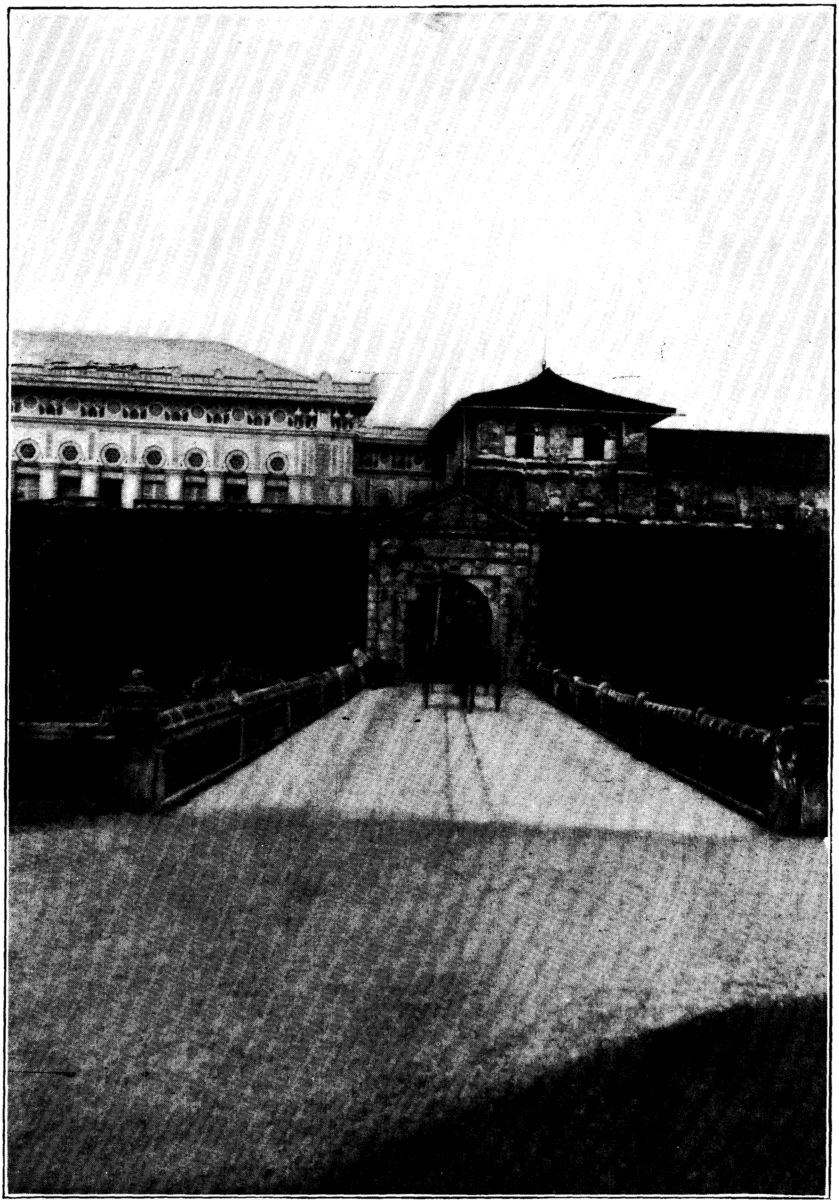
SANTO DOMINGO GATE—BEGINNING WORK OF WIDENING.



REAL GATE THROUGH CITY WALL.



INSIDE OF OUTER REAL GATE, LOOKING TOWARD CALLE NOZALEDA.



SANTA LUCIA GATE.

CONSTRUCTION AND REPAIR OF PUBLIC BUILDINGS.

[Mr. D. S. WILLIAMS, assistant engineer in charge.]

Divisoria Market, the construction of which was begun January 20, 1901, was completed at a total cost of $155,469.50 and opened for use November 11, 1901.

Quinta Market, which was begun July 1, was completed and opened October 21, 1901. The total cost was $67,821.29.

Herran Street Market, which has received extensive repairs, was opened August 15 (about). The cost of repairs was $2,170.12.

Anda Street Market.—Plans were prepared and contract made for ironwork on this market and the material delivered May 13. The site was cleared and excavations completed for foundation footings. Contract was made May 26 for the erection, to be completed in 90 days. At the close of the fiscal year but little progress had been made on the work.

Arranque Street Market.—Contract was let May 28 for extensive repairs to this market; the building was to be cleaned and painted inside and out, gutters and down spouts renewed, new stalls and tables throughout, and iron fence around exterior. At the close of the fiscal year the work was well along toward completion. Plans were made for an extension 24 by 50 meters in rear of this market, and for an arrangement of the entire block, including plans for a morgue building on calle Soler. The site for the extension has been cleared, but it is being used temporarily for market stalls until the repairs in the main building are completed.

Matadero building.—Plans were made and the material ordered for an overhead conveyor track and automatic scales for this building. The material has not arrived.

City pound and police station.—Plans were made and contract let May 23 for the erection of these buildings at Calle Azcarraga and Calle Reina Regente. At the close of the fiscal year the contract was well along toward completion.

City shops, Arroceros street.—The old Arroceros Market site has been cleared and is being put in shape for storerooms and repair shops for the department. As fast as buildings become available they are occupied. There are at present at the site the following: Two buildings, 9 by 30 meters, used by the water department; 1 building, 9 by 30 meters, rented by forestry bureau; 2 buildings, 9 by 9 meters, used as storehouses; 1 building, 9 by 36 meters, used by street department; 1 shed, 6 by 30 meters, used by building and light department. Under construction, 1 two-story house for keeper, 8 by 8 meters.

Santa Cruz Bridge.—This bridge was begun December, 1900. On August 7, 1901, the present abutments were practically completed and erection of iron work begun. The bridge was completed and opened for traffic March 1, 1902, at a total cost of $184,769.10.

The Quinta Bridge.—Over the estero on Calle Echague, was raised 0.60 meters, and approaches and abutments repaired.

Bridge of Spain.—Plans and estimates were made for the extensive repairs to this bridge. New buckle plates, entire, have been contracted for, and are expected during August, and Australian blocks purchased for renewal of the pavement.

San Lazaro Hospital.—Repairs and additions were made to the buildings; nipa buildings erected for cholera detention camps, and buildings erected for vaccine station.

An estimate and plan was made for widening Calle Carvajal, a narrow street 3½ meters wide, in the Binondo District, which was badly infected with plague. The street was widened to 4 meters for a distance of 45 meters, the work being done by contract. It involved the removal of parts of three houses. One 14 by 1.6, one 26 by .90, one 20 by .60.

Reports and estimates were made and submitted as follows: Filling and dredging in San Sebastian Canal, widening gates in Walled City and building approaches, cesspools and drainage for civil hospital, bridge over Binondo Estero, fire stations, Paco, Ermita, San Nicolas and Sampaloc, public closets, repairs to city hall (rented building), canal south of Boca de Vitas, Tondo, Puente Colgante (condition and value), condition of fire apparatus, condition of buildings on Escolta, condition of Intendencia building, condition of signal station, buildings constructed by H. M. Jones on property leased by the city.

Plans and estimates were made for the following, contracts for which are either let or bids advertised for: Central fire station (contract); addition to city stables (advertised); schoolhouse, Tondo (plans completed); boulevard Calle Iris, Azcarraga (plans completed); schoolhouse, Gagalagin (plans); Paco police station (contract); municipal tenements (plans completed).

INSPECTION OF PRIVATE BUILDINGS.

[Mr. J. ALEJANDRINO, assistant engineer, in charge until June 1, 1902. Mr. D. S. WILLIAMS since that date.]

This work, until recently, employed but two inspectors besides the assistant engineer in charge. They were not sufficient for the work, as is shown by the number of violations of the ordinances that proceed to completion, or nearly so, before detection. detection.

Improvement is being made, however, both in the reduction of the number of old and dangerous buildings and in the condition of those being erected. Recently the force has been increased by two (native) subinspectors.

There still remains much work of a corrective nature to be done by this branch of the department.

The dangerous and insanitary buildings in the city come, generally, under two classes. They are, first, the hovels and huts, erected by the poorer laborers on vacant lots or in the interior of blocks in the crowded portions of the city; and second, the houses once good but now fallen into decay and inhabited by the poor, but owned in most cases by parties perfectly able to afford the necessary relief, and who are maintaining them for the few pesos of rent they bring in, in spite of the menace to health and safety, not only of the occupants but others as well.

The above two classes of buildings are the causes of much of the sickness, and must be eradicated before the city can be reasonably free from dangers from this source.

For the second class of houses above named, the proper remedy seems to be to enforce the ordinances with regard to the removal of dangerous buildings.

With the first class of houses, before they can be removed, other arrangements must be made to house the people whose houses are destroyed.

MUNICIPAL TENEMENT.

A tenement accommodating 40 families has been designed, having interior court with cook houses, wash tubs, and latrines, which it is proposed to put up at once on ground made vacant by removal of the huts, the families meanwhile being accommodated in tents in the street, which is wide and dry. Tents will be provided with wooden floors.

The tenement will cost approximately $6,000 United States currency. It is intended to rent for as nearly as possible the amount now paid by the people for ground rent. From a careful calculation of the number of rooms and the condition of the people it appears that this can readily be done, while affording the tenants vastly improved homes.

The following table gives the statistics regarding building permits:

Applications for permits for construction or repair		3,050
Permits granted		2,318
Order given to procure permits for building under construction		192
Orders given to remove buildings without permits, and which did not comply with building ordinances		204
Projecting gratings and other obstructions removed		380
Orders given to repair buildings		91
Orders given to place gutters and down spouts		96
Buildings condemned		85
Amount collected in fees		$5,693.75
Permits granted during the month of June	288	
Permits granted during the month of May	217	
Total		505

Value of building operations represented by the above permits, May and June, $546,900 United States currency.

Information concerning values of buildings and repairs previous to May is not accessible, as up to this time a record of permits and fees only was kept.

SURVEYS.

During the year this office has had but two instrument parties, which have been kept busy practically all the time on special surveys. Recently the number of parties has been increased to five, and considerable progress has been made on the block survey of the city. The districts Intramuros, San Nicolas, Santa Cruz, and Binondo are practically completed, also parts of Quiapo, Tondo, and Ermita.

The need of an accurate city surveyor is being felt every day, and the work should be pushed rapidly to completion. There are no permanent marks locating street lines, and the only guide at present is the existing property lines, which are very irregular, and can not be supposed to represent the original street lines in many cases. Monuments and points for establishing streets are being located, but an ordinance is needed to regulate building lines on existing streets, as some of the streets are all but closed by the apparent encroachments of the property lines.

WATER SUPPLY.

[Mr. H. R. CASYE, superintendent in charge until February 7, 1902; Mr. C. D. GOOCH, chief clerk of the water collection department, in charge until August 1, 1902; Mr. R. G. Dieck, assistant engineer, in charge since that time.]

SANTALON PUMPING STATION.

Various repairs of a minor nature, incident to their use, have been made to the boilers and pumps. Such repairs are made by the regular force.

This plant, the capacity of which was doubled in 1899, was run to its full capacity during March, April, and May of the present year to supply the daily consumption. Since that time the four engines have been run more or less frequently, depending on the rains.

During October, 1901, heavy rains caused the river to overflow, the water rising so as to completely submerge the pumps. The pumps were stopped for one day. After the subsidence of the water the pumps were cleaned and started, having suffered no damage.

Considerable trouble was experienced during the low-water season with the dam below the intake. This structure, which is of a temporary nature, and serves mainly to form a pool about the intake canal, was broken four times during the year and repaired at a cost of $3,500, besides the extra work thrown on the regular force. At the beginning of the next dry season steps should be taken to put in a substantial dam and also to repair the intake.

The houses and grounds at the pumping station were thoroughly cleaned and have been kept in good condition. A temporary frame house was built for the chief engineer at a cost of $200.

The canal from the pumping station to the reservoir, 4.8 kilometers in length, has been cleaned out and kept in repair and is in good condition. This canal will probably carry three times the quantity now passing through it, except for the inverted siphon, 0.4 kilometers in length, where it crosses the Hermitano Valley.

This siphon is of cast-iron pipe, 66 centimers in diameter, and is pushed to its full capacity.

SAN JUAN RESERVOIR.

The subterranean reservoirs at San Juan, two in number, will, together, hold a day's supply of water at the present rate of consumption. This is a dangerously small margin in view of the facts that the pumps are working to their full capacity.

In October, 1901, the United States troops which occupied the grounds since February, 1899, were withdrawn, since which time a guard of metropolitan police has done duty at the reservoir.

During August, 1901, work was begun elevating the covers to the air vents in the top of the reservoirs. They are being raised 50 centimeters to allow a freer circulation of air. The buildings have been repaired and partly painted. A strainer was placed over the discharge of the canal from the pumping station. When the cholera epidemic broke out in March, 1902, this work was suspended, as it was deemed advisable to reduce the employees on the plant to the lowest limit. Work was not resumed during the fiscal year. The reservoirs were last cleaned, one in December, the other in January. This is habitually done twice a year, once at the commencement and once at the end of the rainy season.

DISTRIBUTING SYSTEM.

During the year the main pipe line from the reservoir to Calle Tanduay, this city, at which place it goes underground, was cleaned and painted. The rubbish and undergrowth on the line was cleared away, and the line put in good condition. This line has been laid about twenty years.

The only extension to the city mains that has been made during the year was a small line of 13-centimeter pipe, 550 meters in length, laid on Calle Marques de Camillas, at a total cost of $4,400, Mexican currency, one-half of which was paid by the property holders along the street.

Many demands are made for extensions of the mains to parts of the city not supplied, but the distributing system is already overtaxed and will not admit of material extension until the capacity is increased all along the line.

A number of minor public installations were made during the cholera epidemic to facilitate the work of the board of health.

Among these were a 2-inch pipe on Calle Nagtahan, with a public hydrant, an installation to a hospital established by the citizens of Gagalagin, a suburb of the Tondo district; one near the Puerta de Almacenes, for the use of the city garbage scows, and a sprinkling installation behind the Intendencia Building, where the heavy traffic causes a great deal of dust.

The present water system is unsatisfactory, both to the city and to the consumers. The meters are purchased by the consumers and kept in repair by the city at the owner's expense. The repair work is heavy, both on account of the varied assortment and the unsatisfactoriness of some of the meters used. During the year over 900 meters were taken out and repaired.

REVENUE.

During the fiscal year 1901 there were on the books of this office 1,623 paying consumers, bringing in a revenue of $31,513.66, United States currency, against an expenditure of $54,710.86.

During the fiscal year 1902 the number of paying consumers was increased to 427, besides the transfer of the military government installations from the free to the paying list.

The above, with the fact that beginning April 1, 1902, the general water rates were increased, has put the water supply on a paying basis.

The total revenue for the fiscal year 1902, collected and due, is $62,801.60, against a total expenditure of $55,895.81.

During the latter part of the year a telephone was installed for the water system. One long distance telephone was placed at the pumping station, one at the office, and an intermediate telephone at the Deposito. The cost of the installation was $633, United States currency.

The following is a summary of statistics of the various branches of the water service:

Water comsumption:		
Total amount consumed during the year	cubic meters..	10,593,794
Maximum amount consumed during any month	do....	1,031,866
Minimum amount consumed during any month	do....	790,882
Average amount consumed monthly	do....	882,816
Maximum amount consumed any one day, 4/16/02	do....	40,943
Minimum amount consumed any one day, 10/3/01	do....	8,219
Average daily consumption	do....	29,024
Average consumption per capita, allowing for 250,000 inhabitants in Manila	gallons..	28,240
Comparative yearly increase of consumption in Manila:		
Water consumed during 1897	cubic meters..	6,441,011
Water consumed during 1900	do....	8,305,611
Water consumed during 1901	do....	9,252,844
Water consumed during 1902	do....	10,593,794
Estimated yearly capacity, four engines working continually	do....	13,140,000
Coal consumption:		
Total consumption	tons..	1,908.1
Maximum consumption, any one month	do....	182.5
Minimum consumption, any one month	do....	162.3
Average daily consumption	do....	5.78
Average monthly consumption	do....	173.46
Amount necessary to pump one meter of water	pounds..	44
Cost of coal to pump one meter of water		$0.001
Cost of coal consumed during year		$14,361.88
Oil consumption:		
Cocoanut	gallons..	202
Engine	do....	478
Cylinder	do....	205
Petroleum	do....	747
Total	do....	1,632
Distributing system:		
New installations made		427
Installations cut out from private houses		28
Fire plugs taken out		3
Meters dismounted for repairs		933
Meters remounted, having been repaired		913
Fire plugs repaired		690
Fire-plug boxes changed		43
Wooden covers of fire-plug boxes replaced		251
Fire plugs changed from middle to side of road		13
Mechanism of fountains changed		254
Leaks in mains repaired		943
Public hydrants repaired		944
Leaks in connection repaired		29

Financial statement.

	U. S. currency.
Collections for fiscal year 1902	$36,652.09
Accounts of military government, due	2,149.51
General accounts for fourth quarter, due	24,000.00
Total accounts collected and due	62,801.60
Expenditures for fiscal year 1902	55,801.60
Excess of receipts and accounts due for fiscal year 1902 over disbursements for same time	6,905.79

The most urgent present need in the line of water supply is a material addition to the pumping plant. It will be seen that on one day of the last dry season the water consumption exceeded the maximum daily output of the plant by over 10 per cent. A great increase of consumption was caused this year by the epidemic of cholera, coincident with the dry season which necessitated a free use of water for sprinkling and for flushing out private drains. It is hardly probable, however, that next year will not bring a demand on the already insufficient distribution system that can not be supplied.

The city engineer is preparing plans for a new pump and general improvement of the plant.

Manila has no sewerage or sewer system that can be called a system for the disposal of refuse. Some of the houses which lie near the esteros and whose owners are so inclined have put in separate sewers, emptying into the esteros. Some of the houses not convenient to the esteros discharge into private cesspools. An extended use of either of these arrangements which would materially ameliorate conditions can not be encouraged for lack of the necessary water. Many of the better appointed houses in the city are without either of the above arrangements. In the poorer quarters of the city the conditions are intolerable. This vexed question is at present taxing the board of health to its utmost to meet conditions as they arise.

SEALING OF WEIGHTS AND MEASURES.

The following weights and measures were inspected and tested within the year from July 1, 1901, to June 30, 1902:

Designation.	Number examined.
MEASURES OF CAPACITY.	
Cavans	143
½ cavans	207
Gantas	2,538
½ gantas	2,480
Chupas	3,642
½ chupas	4,591
¼ chupas	4,713
Gallon	2
½ gallon	3
5 liters	4
10 liters	2
20 liters	4
	18,329
MEASURES OF LENGTH.	
Varas	1,645
Yard	24
Meter	21
Fathom	18
	1,708
MEASURES OF WEIGHT.	
Arrobas	124
½ arrobas	71
¼ arrobas	61
Steelyards	1,992
Scales	199
Pounds and fractions thereof	1,238
	3,685
	23,722

Total collections for the year, $2,304.80 United States currency.

Report of operations for three months ending September 30, 1902, department of engineering and public works.

Report of operations of street cleaning, collection of garbage, city stables, parks, crematories, and cemeteries.

Total area of streets cleaned, square meters	279, 752, 220
Average cost per 1,000 square meters	$0. 115
Average cost per 1,000 square meters cleaning and clearing	0. 019

DISTRIBUTION OF LABORERS.

Shovelers	13, 805
Sweepers	14, 219
Gutter cleaners	10, 632
Sprinklers	4, 158
	42, 814
Supervisory (2,195 days)	$1, 952. 77
Laborers (42, 814 days)	$12, 866. 04
Number of loads hauled	41, 460
As follows:	
Dumped at sea	6, 642
Cremated	4, 502
Dumped in park	1, 083
Dumped in suburbs	29, 233
	41, 460
Total area sprinkled ... square meters	37, 659, 346
Average cost per 1,000 square meters	$0. 061

CITY STABLES.

Total number animals employed in street cleaning and parks	179
Total number animals employed in street building	109
Building department, Arroceros shops engineers, etc	34
	322
Total number animals treated in the hospital	102
Total number of animals died	5
Total number of animals on hand	135
Total number of animals (native ponies) on hand	4

HORSESHOEING DURING PERIOD.

Horses	449
Mules	116
Ponies	83
Labor	$887. 72
Materials	108. 81
Value labor	$887. 72
Value material	$108. 81
	996. 53
Number of plants transplanted	958
Number of plants potted	1, 947
Number of plants tubbed	135
Number of mowers sharpened	9
Walks made ... square meters	506

CREMATORIES.

Animals cremated:	
Carabaos	89
Cats	40
Cows	189
Dogs	112
Fowls	1,639
American horses	209
Native horses	235
Mules	171
Pigs	46
Rats	1,276
Cartloads of garbage cremated: House refuse	4,774

	Labor.	Coal.	Cost.
		Tons.	
Santa Cruz	$389.70	131½	$717.99
Paco	432.62	131½	717.99
Total	822.32	263	1,435.98

CEMETERIES.

Paco	interments	104
La Loma	do	1,380

Total labor and expenses, $619.00.

WHEELWRIGHT SHOP.

In the making and repairing of parts for escort wagons, sprinklers, dump carts, etc., labor and material for the following were expended:

Labor	$622.07
Material	491.44
Total	1,113.51

HARNESS SHOP.

Repair work for the police department is done in these shops. During the quarter the following amounts were spent:

Labor	$427.24
Material	367.34
Total	794.58

FORAGE.

Forage received for 97 horses, 27 mules, and 5 ponies, for quarter ending September 30, 1902:

	Hay.	Oats.
	Pounds.	*Pounds.*
Received July 1, 1902	177,900	133,308
Received an addition	10,065	
Received from fire department, reimbursement	1,395	1,164
Received from police department, reimbursement	495	530
Received for P. A. animals	1,800	1,080
Total received	191,655	136,082
Total issued	182,795	117,682
Balance on hand	8,860	18,400

COST OF FORAGE.

	Quantity.	Value.
	Pounds.	
Hay	182,795	$4,047.19
Oats	117,682	3,050.27

FORCE REPORT.

Stable foreman	1
Assistants	2
Blacksmith, American	1
Assistants, American	3
Assistants, native	2
Harness maker	1
Assistant	1
Farrier	1
Teamsters, American	45
Teamsters, native	75
Wheelwrights	2
Assistant, American	1
Assistant, native	1
Laborers	41

Total cost of labor, $17,483.73.

Statement of work done in Botanical Garden, Malacañan, Luneta, Malecon, Vidal, Magallanes, small parks at Parian and Real Gates and Tondo stables.

Area cleaned	square meters	5,948,959
Area mowed	do	658,949
Area graded	do	2,519
Area sodded	do	1,967
Trenches dug	linear meters	322
Cement pipe laid	do	434
Drains laid	do	10
Plants cared for	do	30,816
Trees cared for	do	10,344
Number of seeds planted	do	1,183

BUILDING PERMITS ISSUED.

	Number.	Value.	Fees.
Strong materials:			
New buildings	128	$548,660	$1,335.59
Repairs	146	58,905	
Light materials:			
New buildings	258	23,635	
Repairs	133	3,385	
Total		634,585	
For fiesta stalls			28.75
Total			1,364.34

STREET BUILDING AND REPAIR.

Actual area worked on in the various districts during the quarter ending September 30, 1902:

District No. 1	square meters	4,843.4
District No. 2	do	15,031
District No. 3	do	6,635
District No. 4	do	20,809
District No. 5	do	10,653
District No. 6	do	20,539
Total	do	78,510.4

Department of Paseos		3,415
Bridges repaired		18
City gates repaired		5
Material consumed:		
Broken stone	cubic meters	5,557.08
Gravel	do	496.51
Sand	do	124.25
Cement	barrels	2.50
Curbs (cement)		40.50
Lime	barrels	1.20
Gratings		9.00
Tubes	cubic meters	407.50
Gutters	do	234.50
Guadalupe stone		122.00
Bricks		600.00
Total cost of material		$8,395.02
Labor		$9,777.45
Quarry, total cost of labor		$3,793.78
Transportation:		
2-horse wagons	days	1,169
1-horse carts	do	123
Native carts	do	899
Total cost of transportation		$5,847.18

CITY WATER SYSTEM.

Water pumped	cubic meters	2,415,557
Water consumed	do	2,425,058
Coal consumed	tons	468.1
Oil consumed	gallons	489

BUILDINGS AND ILLUMINATION.

Repairs and alterations and additions were made in the following public buildings: San Fernando police station; Paco, Santa Cruz, and Tanduay fire stations; Matadero and Divisoria markets; Tondo stables and Arroceros shops; Santa Cruz crematory and bridge of Spain.

Arranque market was thoroughly overhauled and repaired and grounds cleaned for work of extension.

San Nicolas fire station.—Site has been cleared and graded and the work of construction is in progress.

Intramuros fire station.—The work of remodeling the building for this purpose, it being formerly a storeroom, was begun, but discontinued in order to proceed with the work in progress at the Paco fire station.

Anda street market.—The framework and roof have been erected. The floor is in process of construction. Proposals for cleaning and painting of ironwork have been called for.

City lighting.—29 incandescent lights were installed as follows: 13 at the Tanduay fire station and 16 at the Paco fire station. Paco and Santa Ana circuit of 10-arc lamps has been completed and is in service. Three improved type, inclosed, arc lamps were installed in the Arranque market and are in service. The work of lighting Tondo and Trozo districts is progressing.

Samraloc police station.—The installation was repaired and two unserviceable sockets replaced.

Telephones.—The entire service was suspended for four days, owing to typhonic weather. Position of the telephones in the office of the chief of the secret service was changed.

POLICE DEPARTMENT.

Upon the establishment of civil government in Manila, on August 7, 1901, the city came into possession of a metropolitan police, officered by volunteer officers who had been retained on duty after the muster out of their respective regiments. The police force consisted of 40 sergeants, 40 roundsmen, 500 patrolmen, and 20 volunteer officers on duty with the police department; an army surgeon filled the position of police surgeon. The native police force consisted of 1 inspector, 1 surgeon, 9 captains, 20 lieutenants, 73 sergeants, 71 roundsmen, and 1,029 patrolmen. Of the above native force, 4 companies were on duty in the towns adjacent to Manila, and were immediately mustered out of the service by order of the civil governor, and never really became a part of the police force under the civil government. On August 7, the following officers and men were retained in accordance with the law organizing the metropolitan police force, viz, 1 inspector, 1 surgeon, 6 captains, 40 sergeants, 39 roundsmen, and 500 patrolmen. The native police force: 1 inspector, 1 surgeon, 6 captains, 37 sergeants, 37 roundsmen, and 569 patrolmen. This force was reduced on August 31 to the following strength: Metropolitan police force—1 inspector, 1 surgeon, 6 captains, 32 sergeants, 32 roundsmen, and 400 patrolmen. The native police force was reduced to 1 inspector, 1 surgeon, 6 captains, 32 sergeants, 36 roundsmen, and 528 patrolmen.

On November 1, the police department was reorganized by act No. 286 of the United States Philippine Commission, which act designated the following officers and men: One chief of police, 1 inspector and assistant chief of police, 1 assistant inspector, 1 surgeon, 1 assistant surgeon, 6 captains, 6 lieutenants, 20 first-class sergeants, 20 first-class roundsmen, 300 first-class patrolmen, 28 third-class sergeants, 28 third-class roundsmen, and 360 third-class patrolmen; 1 chief clerk, 1 property clerk, a force of 12 clerks, stenographers and interpreters, and 2 messengers; 1 chief of the secret service bureau and 24 clerks, detectives and messengers; river and harbor police, 1 captain, 3 first-class sergeants, 3 first-class roundsmen, 24 first-class patrolmen, 3 third-class sergeants, 3 third-class roundsmen, and 24 third-class patrolmen. The act authorizing the department provided that first-class police should have a thorough knowledge of the English language and be familiar with the duties of a police officer; that the third-class police should be able to read and write Spanish, and that as soon as they acquired a sufficient knowledge of the English language to transact the ordinary duties of a policeman they should be advanced to the grade of second-class policemen and their pay increased 25 per cent. Prior to March 1, 1902, examinations for promotion to second-class police were held by the police department; since March 1 the civil-service board has held examinations to determine the fitness of third-class policemen to be advanced to the grade of second-class.

After the reorganization of the department, Capt. J. E. Harding was made inspector and assistant chief of police and exercised general supervision over the police department and special supervision over the records of the office and the various police stations, conducting summary court trials and all investigations relating thereto. Lieut. E. S. Luthi was appointed assistant inspector and given especial supervision over the second and third class police.

Under the reorganization a launch was purchased and the river and harbor police organized under command of Captain Chadwick, who was succeeded, upon his resignation, by Lieutenant Wilson. This branch of the department has performed valuable service, and when harbor regulations are adopted its efficiency will be greatly increased. At the present time the river and harbor police have no regulations and simply carry out the orders of the captain of the port and the chief of police. They serve all processes on ships in the bay, and have been called on several occasions to quell mutiny and bring the offenders ashore.

SALARIES.

The salaries paid the members of the Manila police department, viz: Chief of police, $3,500; inspector and assistant chief, $2,500; assistant inspector and captains, $2,000; lieutenants, $1,500 and $1,200; first-class sergeants, $1,200; first-class roundsmen, $1,080; first-class patrolmen, $900; surgeon, $1,800; assistant surgeon (Filipino), $1,200. When the cost of living in Manila is taken into consideration, the salaries paid leave very little money gained.

SURGEONS.

The department is limited to two surgeons. Dr. Yemans cares for the metropolitan police, the fire department, makes the necessary physical examinations for the civil-service board of candidates for these two departments, and is required to perform the ordinary duties of coroner when called upon by the prosecuting attorney.

Dr. Baldomero Roxas attends to the native police and firemen. Both surgeons are required to visit all stations each day. Serious cases are sent to the government civil hospital.

CLASSIFICATION.

The members of the first-class police, known as metropolitans, were originally selected by company commanders of the regular and volunteer regiments in the Philippine Islands, each commander detailing two men possessing the best physical and mental qualities, thus forming the nucleus of the present excellent organization. In some few cases the men were found not to be suitable for police work, but these were soon weeded out, and the vacancies arising from time to time have been filled by honorably discharged soldiers from the United States Army, many of them having served for several years as noncommissioned officers, possessing high recommendations from company and regimental commanders. The members of the third-class police were recruited from the original twelve companies of the native police and were judged by their previous service in the police department and their adaptability to the peculiar conditions then existing at a time when affairs were beginning to settle down after three years of insurrection. The third-class police have made wonderful advance since the organization of civil government, and if they continue as at present there will soon be no third-class police, as the majority of the men are paying strict attention to their duties and trying to master the English language, and as fast as possible they are being advanced to the second class.

SCHOOLS.

Night schools were opened at the various police stations by the city superintendent of schools for the benefit of the third-class police. The men took readily to the instruction, displaying great diligence in their studies and many of them rapidly acquired a working knowledge of English, so that at the present time practically all the native policemen can intelligently answer ordinary questions as to direction or common requests made of policemen by English speaking persons. On account of the extra work which has fallen on the police department since the cholera epidemic, the attendance in many of the schools fell below the average required by the city superintendent for the maintenance of a school and they have consequently been abandoned. This is most unfortunate and has much retarded the progress of the native police, and it is hoped that the department will be able to open new schools after the Christmas season. Previous to the epidemic of cholera, at the end of each month examinations were held by the night-school teachers in conjunction with the inspector of police and the assistant inspector, and those passing a satisfactory examination were promoted to the second class. This system caused great rivalry and was thoroughly satisfactory.

CHOLERA EPIDEMIC.

During the cholera epidemic, which has lasted since March and is still present in a modified form, a great amount of extra work was performed intelligently and without complaint by the policemen of all classes. As a result six lost their lives, four of these being Filipinos and two Americans. At one time over 500 special police were employed in order to maintain the quarantine, which for a while was imposed on each house or place where a cholera victim was discovered, for a period of five days. In order to reduce the expense, the regular police were frequently detailed to guard these houses and they performed their duties in a very satisfactory manner, often working many hours overtime. Both detention camps established by the board of health were guarded by members of the police department, and up to the time of abandonment the surgeons in charge were generous in their praises of the manner in which the men performed their work. In many cases both the third and first class police acted as sanitary inspectors, helping to handle those who had died of the cholera, or cases under suspicion, all of which was not only exceedingly trying, but dangerous.

CHANGE FROM MILITARY TO CIVIL.

The change from the military to the civil government and the instruction of the police in the laws and rights of private citizens was a work of great magnitude. With the Americans this was not easy. Most of them had been accustomed to two or more years of military service, but they had been away from the operation of civil law. In the case of the native police the proposition was far more difficult, for the reason that they were thoroughly and totally ignorant of the American ideas of right and liberty. Particularly was this noticeable in the first attempts at enforcing regulations in regard to entering houses in accordance with the proper process of law.

Instructing the inhabitants of the city of Manila how and where to seek redress for any wrongs and complaints and explaining the use of a warrant and many other legal forms whereby they can secure their rights, has made many friends for the department, especially among the natives of the city. In the past six months there has not been a complaint of a policeman entering a house without complying with all the requirements prescribed by law. When it is considered that this practice was carried on frequently in the past with great abuse, it shows conclusively that the men are earnestly endeavoring to promote civil government. It is and has been the constant aim of the department at all times to recognize the rights of all citizens and where possible to prevent crime rather than to await its culmination and arrest the guilty.

RELATIONS WITH THE MILITARY.

The department has maintained the best relations with the military authorities and has been closely in touch with the commanding officers of the post of Manila, who have at all times cooperated with the greatest courtesy and consideration.

RELATIONS WITH THE CONSTABULARY.

On various occasions in the pursuit of criminals on the outskirts of the city of Manila, the metropolitan and native police have cooperated with the constabulary, sent out companies under officers and at other times small detachments under noncommissioned officers. Very important arrests have been made and on several of these trips there have been sent from 100 to 125 third-class police and the mounted detachment. In general the result has been good and effective. Four of the American patrolmen and one roundsman were detailed for several weeks with the constabulary in the island of Leyte and acquitted themselves with great credit to the department. Owing to the peculiar conditions in Manila as the headquarters of all commercial, political, religious, and criminal agitation, the department has been keenly alive to the necessity for real and complete cooperation with the constabulary, which has in its charge the preservation of peace throughout the archipelago. Time after time offenders have been traced through the provinces and finally into the city of Manila. Besides this, the outer suburbs from Caloocan clear around the limits of the city of Pasay are a well-known refuge for a class of petty thieves operating in the city and the more dangerous bands of ladrones driven from pillar to post until they find in this zone a temporary refuge, where they may pretend to carry on a legitimate business in the metropolis while operating on the peasantry of the near-by provinces. Thus their aim is to maintain a good appearance with municipal and provincial authorities and to prey upon both. The department thoroughly realizes the necessity of cooperating with the constabulary in the breaking up of this criminal zone, and is always ready to pursue and arrest, on proper warrant, within the city limits, and to obtain information which may be needed by the constabulary. The police have been particularly active in discovering and breaking up bands of political plotters and criminal resorts within the city limits, and they have frequently made important captures before the men could effect their escape into the provinces. Much of this work has been carried on in conjunction with the constabulary, and by this cooperation the offenders have found themselves hemmed in by both forces. By keeping the police acquainted with their movements within the city the members of the constabulary have been greatly aided in obtaining information and securing "wanted" persons. An interchange of alarms has greatly facilitated arrests, both within the city and out.

MOUNTED DETACHMENT.

The mounted detachment consists of nine patrolmen and one sergeant, and patrols the outskirts of the city each night, and has rendered valuable service. This detachment is at present stationed at the Deposito, from which point it can easily reach the districts in which disturbances are most likely to occur. These men and also the native police employed in patrolling the outlying districts carry shot guns as well as revolvers at night.

ALARM SYSTEM.

At the present time the police department is dependent upon the public telephone system, which is entirely inadequate and unreliable. On frequent occasions great difficulty has been experienced in obtaining communication with stations or with police headquarters from various points of the city outside of the offices of the department. It has been found necessary to detail three members of the department in the central telephone office to attend to police calls. The Gamewell Police and Fire Alarm System is now being installed, and when completed will put this city on an equal footing with any in the United States.

PRECINCTS.

For police purposes the city is divided into six precincts, each having one or more stations, and each precinct being under the command of a captain, except in Precinct No. 1, which is under the command of a lieutenant.

The commanders are as follows: No. 1, Lieut. Horace G. Toone; No. 2, Capt. Ward P. Shattuck; No. 3, Capt. Jack Dawson; No. 4, Capt. A. J. Burt; No. 5, Capt. José de Crame; No. 6, Capt. Joaquin Monet.

The department operates under the three-platoon system. The hours of service and relief are as follows: Parian, Malate, Ermita, Paco, Analogue, and Tondo platoons are relieved at 7 a. m., 1 p. m., 7 p. m., and 1 a. m. Santa Cruz, Sampaloc, and San Fernando platoons are relieved at 7 a. m., 3 p. m., and 11 p. m.

STATION DETECTIVES.

There is one station detective at each station, American and native. These men are members of the uniformed police and their duties are to handle cases which can not well be conducted by the police in uniform, and their work is similar to that performed by the detective bureau. They are required to keep themselves in readiness for duty at all hours, and they perform their duties wearing plain clothes. There is no extra money allowance for these station men. The constant petty thieving incident to this jurisdiction requires intelligent service in detective work, and frequently can be carried on by these station detectives to greater advantage than by employing the detective bureau, which is busy on cases of more importance.

COURT DETAILS.

There are two municipal courts—at Santa Cruz and Parian. At Santa Cruz one first-class sergeant is detailed as court sergeant and one first-class and one third-class patrolman perform the duties of court bailiffs. At Parian court one first-class sergeant is detailed as court sergeant and one first-class patrolman and one second-class sergeant act as court bailiffs.

TRANSPORTATION OF PRISONERS.

Since the organization of the department the police have had entire charge of the handling of prisoners, both in the municipal courts and the courts of first instance, and this work has brought a great deal of extra duty upon the limited service, which consists of two patrol wagons. The sheriff will handle prisoners for the courts of first instance after the first of November.

NEW BUILDINGS.

As soon as the revenues of the city will permit it, careful attention will be given to the selection of suitable police buildings and stations. At the present time the force is housed largely in unsuitable rented buildings. Most of the old stations used by the former government are in such condition as to be unfit for occupation without very extensive repairs, and it will be found better and cheaper, in most cases, to erect new buildings. Rents are constantly increasing, and almost every quarter the department is besieged with petitions and demands for from 20 to 50 and 60 per cent additional. To meet emergencies temporary cells have been constructed of wood, with iron doors and concrete floors, but they are not at all satisfactory. A few prisoners have escaped, simply by reason of the rotten condition of the buildings, in some cases the roof having been pried up or the ancient bars on the windows having been broken through in rusty places. Within a few days the new station house for the district of Paco will be completed, at a cost of between $5,000 and $5,500. It is constructed almost entirely of American lumber, with corrugated iron roof and cement floors, and has a large squad room which has been specially designed for a school and for purposes of general instruction and drill during the rainy weather. A commodious room and an office have been provided for the officer of the precinct, and on the lower floor are the office of the ser[illegible]nt and the room for the noncommissioned officers. The site has already bee[illegible]ected for a station in the district of Tondo; building to cost about $5,000. [illegible]very much needed at this point, as the vicinity has always proved troubles[illegible]nd is near a resort of the lawless element and provincial ladrones referred to in a previous paragraph. At the present time the offices of the chief of police and the inspector are in the city hall, insuring easy communication with the board. As soon as possible a central station should be constructed, containing a city jail, offices of the police-alarm system, and the municipal courts and suitable quarters for patrolmen. A piece of property on the corner of the Botanical Gardens nearest the Bridge of Spain, through which a road is now in course of construction, is the most favorable location. It is not desired that the gardens should be sacrificed any more than necessary, but this small section has always been separated by reason of a road leading to the Suspension Bridge and is further cut off by the new road made necessary by the increased traffic over the new Santa Cruz bridge. There is plenty of room here to provide an addition to the quarters and offices already mentioned, a drill hall and gymnasium and such facilities as contribute to the health and strength of the men. Within the last month the substantial building owned by the government and known as the San Fernando police station has been remodeled and painted, new cells constructed, and sanitary arrangements installed, so that it is now in very good condition. This building is also used by the river and harbor police. The Santa Cruz station has been remodeled so as to accommodate the fire department in the main section of the building, but the work in the police section was designed in a very unsuitable manner, the entrance to the station and court room being only by a flight of winding stairs, the hall way being narrow and not properly lighted, and the quarters of the men very inadequately supplied with showers and closets. As a result it has been found necessary for a number of the men to seek quarters outside of the building.

POUND.

The city pound has been established under the direction of the police department and a roundsman placed in charge. All stray animals are immediately taken up and impounded according to law. Owing to the numberless cur dogs that have overrun the city during the last three years, when pound regulations were not enforced, the work of this branch has been exceedingly heavy and a great number of dogs have been impounded. As a rule but few dogs have been redeemed, and the others are killed and cremated after being detained for the time prescribed by ordinance. Quarters and stables for the mounted detachment were constructed on the strip of city land containing the city stables and the site of the new crematory, but they had to be abandoned owing to the low ground, which produced much sickness among the men and horses. The contract was carried out in an unsatisfactory manner and the plans of the building appear to have been on too light a scale, for parts of the roof are already sagging and in bad repair. An investigation is now being held in conjunction with the public works department to ascertain where the blame lies. Before this ground can be used, filling to the extent of more than one-half a meter, and in some places a meter, will have to be done, as the land is swampy and subject to overflows from the neighboring estero, and in the rainy season the water lies inches deep over large stretches.

MEALS FOR PRISONERS.

Prisoners detained in station awaiting trial are fed by contract. The bidding has never been very brisk for this work and the Chinese have almost monopolized the supplying of food, which is of a good class and required to be served properly cooked, in clean dishes; as there were some abuses in the beginning and it was claimed that the prisoners were not properly cared for, having a poor quality of rice and fish, too aged to be palatable, stringent orders have been put in force, whereby the sergeant in charge furnishes his precinct commander with a daily report and the latter furnishes the chief with weekly reports. This insures prompt correction of any violation of the contract. During the cholera epidemic, when the quarantine was imposed on the main prison at Bilibid, prisoners awaiting confinement were required to undergo a five days' observation. This necessitated a temporary jail, and with the permission of the military authorities Postigo Prison was repaired and put in shape and filled this need. This prison was under the charge of Lieut. George Seaver and was maintained until October 10 of this year, when the quarantine [illegible] removed by the board of health. On that date all prisoners and papers wer[illegible]sferred from the Postigo detention prison to Bilibid and the warden's receipt tak[illegible]erefor. During the period of quarantine 1,685 prisoners served out their five days' quarantine. The number of cases of sickness was remarkably small, as the following table shows:

Fever (malarial)	4
Fever (dengue)	2
Leprosy	2
Beri-beri	5
Insanity	8
Cholera (diagnosis doubtful; victim recovered)	1

There were also three cases of childbirth. Owing to the dilapidated condition of the building, more attention having been given to the cleaning of the premises and the securing of proper sanitary regulations than to the strengthening of weak parts, four prisoners effected their escape, all of whom were recaptured and are now serving sentence in Bilibid.

HOUSE OF DETENTION.

The city is in great need of a suitable place for the reception and detention of children under 16 years of age and of women and children over 16 years of age arrested by the police for violation of law or ordinance or held as witnesses or pending investigation, etc. At the present time there are no facilities for handling this class of prisoners. It is not proper to send them to jail, where they meet with the worst criminal element and serve out their sentences with the same restrictions as apply to common criminals, and there is no opportunity for instruction or such proper care as would in a great many cases bring about reform. Such a place of confinement and correction would, in a great many cases, save humiliation, if not permanent disgrace and abandonment, which too often follow incarceration behind the bars, and weak and unfortunate females and children would be insured a kindly care during the period they were deprived of their liberty. On May 22, 1902, the board forwarded the following resolution to the United States Philippine Commission, and as soon as possible it is hoped that action will be taken:

"Whereas eight months of observation of existing conditions, with frequent reports and consultations with various officers of the city, have demonstrated that immediate necessity exists for the establishment of institutions for the care of the insane, the incorrigible youth, and paupers; and

"Whereas neither the city of Manila nor any other city in the Philippine Islands is financially able to establish and maintain independent institutions of this nature; and

"Whereas institutions of this kind are generally controlled by a general or state government to better advantage than by a municipal government; and

"Whereas the population of the Philippine Islands is such that institutions of this kind would tend to remove from public view and provide for those who are now a burden upon a class of people charitably inclined, but who have no interest in the mental or moral education of the subjects of their charity; be it

"*Resolved*, That the United States Philippine Commission be requested, as an urgent necessity, to enact such legislation as will provide for the establishment, control, and maintenance of an insular insane asylum, a poorhouse, a reformatory, and a reform school; and, if necessary in order to maintain such institutions, municipalities or provinces to be required to contribute to their support in such manner as the Commission shall deem equitable."

CRIMINAL IDENTIFICATION.

At the present time the city has no well-established method of criminal identification. Photographs and descriptions are the only sources of record and information. As soon as practicable the Bertillon system will be established and a careful record made of all prisoners. This will be especially useful in connection with other municipalities and with the constabulary, as well as the neighboring cities of the Orient, which being seaport towns and filled with all nationalities, well afford attractions for the criminal element.

UNIFORMS.

The question of the most suitable uniform for service in the Tropics has not yet been satisfactorily settled. At the time of its organization the department was equipped with khaki suits, leather leggings, and a high cap with a large crown. The khaki was found very suitable, but the cap offered practically no protection from the intense rays of the sun. The leather leggings were found to be extremely warm, and during the wet weather the perspiration and dampness and the rotting of the leather caused a great deal of suffering from ulcers and skin sores. A gray cañamo uniform was prescribed for the native police, with blue stripes, and a cap somewhat smaller than that worn by the metropolitan police. No leggings were used, and this outfit has proven very satisfactory and has been continued unchanged. On the 4th of July, at the almost unanimous request of the metropolitan police, the uniform was changed to blue serge, a blue helmet, and short blouse, with turn-over collar, and tan shoes. Experience has demonstrated most conclusively that this uniform is not suitable. The department has been in communication with the police of Singapore, Hongkong, and Shanghai, and in the near future a new and permanent uniform will be adopted, based on the experience of these cities. The metropolitan police are particularly averse to the use of the helmet and desire to return to a hat resembling the old campaign hat, with which the greater majority of them became familiar during their army service. During the wet weather it has been found necessary to use rubber capes or coats and rubber coverings for the caps and helmets. Up to the present time the changes in the uniform can not be classed as other than experiments, and the adoption of the permanent uniform in the near future will eliminate much confusion as well as expense.

LIQUOR LICENSES.

The licensed drinking places in the city have been conducted almost entirely on the recommendations of the police, and a well-defined improvement has been noted. For a time before the organization of the civil police, the central portions of the city were overcrowded with saloons, which had crept in under the strenuous days of military management; but these have been gradually weeded out and taken off the prominent highways, and considering the increase in population the proportion of saloons has decreased. In many of the resident districts saloons are not permitted. The natives conduct many small tiendas or drinking places, selling light wines and soft drinks, and these have been restricted as far as possible to the districts largely inhabited by their particular class of customers. Such so-called saloons seldom cause trouble, and are, as a rule, extremely orderly and well kept.

SCHOOL OF INSTRUCTION.

Owing to the large amount of work which the police have at present, and have had since the organization of the department, it has been impossible to establish a proper school of instruction whereby they may be more fully informed regarding modern police methods. This class of work has been confined to short daily instruction in the duties of a policeman and in the provisions of the city ordinances and in ordinary drill and setting-up exercises, and a weekly drill. As soon as practicable a system will be incorporated providing for regular competent instruction in all matters relating to police work, including methods of handling prisoners, the use of the club, and target practice. The metropolitan police are nearly all familiar with the use of a pistol and it will require but little schooling in order to put them in the first rate of efficiency, but the native police have never been properly instructed in the use of a revolver and need to be carefully taught.

VAGRANTS AND ARRESTS.

The number of arrests made in the city since the organization of the department is large, but compares favorably with the corresponding period of the previous year, when the city was under military government and the affairs were in an unsettled state, attendant upon a time of insurrectionary disturbances. The offenses were in most cases small misdemeanors or violations of city ordinances. It has been the custom on the first violation of city ordinances to give the offender his liberty and caution him that a repetition will cause punishment. This method has made for the department a large number of friends, especially among the Filipinos, and it is found to be very effective. The criminal element is kept well under control and many convictions have been obtained under the strong vagrancy ordinance. The population of Manila is largely made up of a class of people which is ignorant of the law and unfamiliar with progress, and it is a difficult matter to make known the ordinances. This is more especially difficult as the new laws differ in many respects from those in force under the Spanish Government, and the police have been very largely occupied in warning the lower classes against the various infractions and in correcting numerous abuses. In this matter they have displayed much discretion and have avoided overcrowding the courts for petty offenses by timely advice. To the lower Filipinos the idea of a few weeks or months in jail holds out no particular fear. Beyond the limited degree of disgrace, they suffer nothing of a particularly harsh punishment, being merely required to pass the time without liberty, but nevertheless enjoying good meals and healthy quarters and plenty of time for sleep and rest, which last appeals most strongly. It is believed that in a majority of light offences and specially in the case of numerous small infractions, such as fighting on the street and petty thieving and abuse of public places, that a proper administration of the rattan would be far more effective and expedient, as it would obviate the necessity of loading up the jails with people who are unable or unwilling to pay the small fines imposed in the courts. Instead of a period of idleness they could be well placed at some useful occupation, and the board has under consideration a plan for employing prisoners, of long terms involving hard labor, at the quarries or on the outside roads of the municipality.

POLICE AREA.

In order to give a fair idea of the comparison of the area and the force of Manila, the following table is presented:

Town.	Area.	Force.
	Acres.	
Baltimore	20,254	944
Boston	23,361	1,194
Chicago	122,094	2,903
Cincinnati	21,920	524
Detroit	18,560	520
Milwaukee	14,419	314
Greater New York	187,147	7,463
St. Louis	40,000	976
Washington	49,320	540
Manila	7,390	837

GAMBLING.

Public gambling houses are prohibited by ordinance and have been rigidly suppressed by the police. The population of Manila is in a large measure addicted to gambling. The Chinese are inveterate gamblers and the Filipinos have for years been accustomed to cockfighting and monte, as well as innumerable smaller forms. Shutting down on all this with one stroke of law is a diffcult matter and has aroused a great deal of opposition, but it has been successfully handled. The police have been especially careful in first warning and citing ordinances, and in places where the gambling continued they have caused arrests and secured convictions. During the disturbed period previous to August 7, 1901, gambling was more or less unrestricted for obvious reasons, and for a time existed in many forms, even in the heart of the city. Most of the gamblers have now been driven out of town beyond the city limits, where the provincial authorities have control. It is useless to state that public gambling does not exist in the city of Manila, but as fast as places are discovered the bankers and players are discouraged and arrested and the practice is being broken up. The suppression of cockfighting has been attended with a considerable measure of success. Merchants, contractors, and all the employers of labor in general have felt the benefit of the elimination of this vice and so-called national sport. From time to time urgent requests have been made by people of prominence and influence to permit cockfighting on Sundays and holidays, but in accordance with the ordinances these requests have been uniformly denied. However, experiences in the provinces, where cockfighting is still permitted on special days, may demonstrate that it will be well to again permit it on Sundays and holidays within the city, but this is doubtful.

CHIEF OF POLICE.

On May 14 the first chief of police of Manila under the civil government, Mr. George Curry, obtained a six weeks' leave of absence and resigned at the expiration of same. Much of the success of the police department is due to the untiring efforts of this officer. Since the above date the department has been under command of Capt. J. E. Harding, inspector and acting chief of police, who has performed his laborious duties handicapped by a lack of officers and under the trying conditions of the cholera epidemic.

In the attached reports will be found statements of the expenditures, outstanding indebtedness of this department, the effective strength of officers and men to September 30, and the report of prisoners apprehended by the department during the above period.

SECRET SERVICE BUREAU.

The secret-service bureau has been under charge of the chief, Mr. Charles R. Trowbridge since its organization, on August 7, 1901, except during his earned leave in the United States when the bureau was under Mr. Carl B. Hard. Chief Trowbridge has been exceptionally successful in this branch of the service, being most thoroughly trained during his long experience under the military authorities. This bureau is a most important branch of the department. The chief has no regularly defined hours of duty, although required to be in his office during certain hours of the day, but he is always accessible and on the alert. Close communication is maintained with the chief of police, who naturally relies on him to a great extent in the pursuit of criminals. The members of the bureau have been selected slowly and with great care, and have been subjected to hard and difficult schooling. Previous to August 7, 1901, the department was under the jurisdiction of the military authorities, when the duties performed consisted of general secret-service work incidental to the military occupation of a foreign country, viz, to detect and frustrate plots against the government, locating and arresting insurgent leaders, and the capturing of insurgent records and munitions of war, as well as performing all the criminal work necessary in this city. At this time, the country being under martial law, arrests were made under that authority, without the application of civil process, simplifying to a great extent the duties of the secret-service agents, as compared with the present.

As the insurgent army disbanded, great numbers of its officers and soldiers came to Manila, and as they had done nothing but soldier for many years, they were not disposed to settle down immediately to peaceful vocations, and were willing to engage in any pursuit that did not demand any mental or physical exertion. These constitute a large class in the city to-day.

As the former work of the bureau had changed to a great extent with the change of the administration, the members of the force were instructed and drilled in the civil law and its processes, and the present work was commenced of keeping down the criminal element and ridding society as much as possible of the vicious and idle class which infested the city at the close of the military rule. The secret-service force was also greatly reduced at the same time, and the members remaining were selected as being the most thoroughly trained.

The individual work of the secret-service agents of this department should not be compared with that performed by similar officials in the States. The cosmopolitan population of the city, the many languages spoken, the necessity of being conversant with these languages, the intensely secretive nature inherent in the Oriental, and their fear of revenge for testimony and information given, consequent to generations of Spanish domination, render the task of handling native criminals arduous in the extreme. This, taken together with the large and increasing number of adventurers, Americans and Europeans, constantly arriving in these islands, who expect to be able to make a living without working for it, taxes the energies of the force to the utmost.

Since its creation under the civil government this department has apprehended and brought to justice the authors of every murder committed within its jurisdiction with the exception of two who escaped to the provinces.

Horse stealing, formerly one of the most practiced crimes, has been reduced to a minimum.

The Oriental possesses a peculiar aptitude for counterfeiting, and cases of this nature are constantly under investigation by this department. The results of these investigations may best be seen in the numbers of persons serving sentence for so doing.

During the early days of American occupation, and while Bilibid prison was still in charge of the Spanish authorities, great numbers of prisoners of the worst class effected their escape, and although this office is continually locating them and returning them to the prison the majority of them are still at large.

The great mass of the Filipino and Chinese being uneducated and possessing but little knowledge of their personal rights, are easily imposed upon by unscrupulous persons, impersonating police officers, sanitary inspectors, and other officials.

The total expenses of the bureau approximate $2,000 United States currency per month, and the amount of lost and stolen money and property recovered in the same period of time often exceeds that amount. This office maintains a correspondence with the other large cities of the Orient and the United States with reference to criminal information, and ascertains the whereabouts of missing and wanted people, of whom there would appear to be an unlimited number in these islands.

There are on file in this office about 3,000 photographs of convicted criminals of all classes and nationalities, together with a complete description of the same, and the records contain information pertinent to every political and criminal case which has ever come under the supervision of the department.

It may be found advisable to give the American agents the rank equal to that of a police sergeant. This is customary in the United States, and is necessary for the fact that it gives them power in special and emergency cases to use the services of a policeman in the fulfillment of their duties.

This office has always maintained a hearty cooperation with the constabulary in the matter of locating and arresting persons who escape from Manila to the provinces, and vice versa.

The indiscriminate practicing of private detectives has been curtailed, and although many have made applications as representatives of various private detective bureaus in the United States for authority to make arrests in Manila, the peculiar conditions existing and the great opportunity for abuse of such power has caused the department to deny them. Private detectives have been given cards authorizing them to facilitate arrests by displaying the same to policemen, who are directed to aid these men in every way, strictly adhering, however, to established laws regarding the apprehending and detaining of offenders.

COOPERATION OF AMERICAN AND NATIVE POLICE.

The department has insisted on and encouraged close cooperation between the American and native police, and the results are highly satisfactory. At the time of the organization of the department the problem of making a good policeman of the native was, by reason of the then existing conditions, a serious undertaking. The natives were still in active insurrection against the authority of the United States, and the native population in a large measure discouraged enlistment and looked down upon the Filipino police. Besides, many full-fledged insurrectos managed to enlist in order to further the cause of Aguinaldo. Such cases were closely watched and finally weeded out. Under these conditions, the American policemen who had been soldiers and actively fighting against the Filipinos up to the time of their discharge from the Army, evinced no great desire to work with the native police. It was found necessary to place the two classes of the police in separate districts, but gradually, as a result of careful instruction and advice, and the growing efficiency of the native police, greatly aided by the example of the officers, these conditions have disappeared and the cooperation is everywhere noticeable.

Captain Monet, of the native police, is a Spaniard, who was an officer in the Spanish army, and was stationed in the line which held the trenches to the south of Manila when the American army entered the city. Lieutenant de Malibot was with the insurgents in Cuba and afterwards was in command of a section of the Camarines, which was finally pacified by the active warfare carried on under command of Capt. George Curry, later the first chief of police. Captain Luthi, who is giving the native police his special care, was very active in suppressing the guerrilla warfare in the provinces, and has acquired a knowledge of local dialects. Captain Crame was in the Spanish secret service and has been with the native police force since its organization.

All the past appears to be forgotten and Filipinos and Americans are working for the one common object, namely, the advancement of civil rule and order. It has been found advisable to enlist many prominent ex-insurgents, some of them having been lieutenants and captains and one a major, and the effectiveness of the native police is largely due to the work of these men, who are now, in several instances, corporals and sergeants.

CIVIL SERVICE.

Under Chief Curry a special police civil service was organized, and all entering after the reorganization of November, 1901, began their first duties as patrolmen and were promoted through the various grades according to their merits and services. Two of the captains and four of the lieutenants were formerly patrolmen in the department and worked their way through the grades. On March 1 the department went regularly into the Philippine civil service.

One of the great drawbacks of the department has been the absolute necessity for rapid promotion. The men have not had time to acquire the proper knowledge of the subordinate grades. The first officers were chosen on account of their efficient services as officers in the army, but in nearly all cases they were not familiar with the special requirements of police work. Naturally several resignations occurred and these vacancies had to be filled from the lower ranks. Gradually this condition of affairs is being improved and the whole department is being subjected to more rigid instruction and discipline. As soon as possible a period of probation will be imposed, requiring service as a patrolman for at least a year before being eligible for promotion.

Statement of expenditures of department of police for the period of August 7, 1901, to September 30, 1902, and outstanding indebtedness September 30, 1902.

	Aug. 7, 1901, to June 30, 1902. (U. S. currency.)	July 1, 1902, to Sept. 30, 1902. (Local currency.)
Salaries and wages	$486,430.89	$201,770.77
Salaries, cholera police	16,406.00	12,282.02
Stationery and office supplies	2,502.56	
Contingent expenses	7,997.54	1,785.68
Equipment	25,050.54	606.65
Transportation	3,187.27	1,636.25
General supplies, repairs, etc	11,002.23	8,825.71
Total	552,577.03	226,907.08

OUTSTANDING INDEBTEDNESS.

Salaries and wages	$668.41
Contingent expenses, including transportation and incidentals	164.06
Total outstanding indebtedness	832.47

The above statement of indebtedness does not include articles procured from the insular purchasing agent for sale to members of the department. The funds realized from sale of same have been deposited in the treasury and an appropriation asked for to cover the obligation.

Report of strength of the department of police for the month ending September 30, 1902.

	Present for duty.	Sick.	Suspended.	On leave.	Total.
Inspector and acting chief	1				1
Chief secret service	1				1
Assistant inspector	1				1
Surgeon	1				1
Assistant surgeon	1				1
Captains	6				6
Lieutenants	6				6
First-class sergeants	19				19
First-class roundsmen	17	1			18
First-class patrolmen	259	24	5	2	290
Second-class sergeants	9			1	10
Second-class roundsmen	5			1	6
Second-class patrolmen	26				26
Third-class sergeants	14	1			15
Third-class roundsmen	18	1		1	20
Third-class patrolmen	297	9	2	1	309
RIVER AND HARBOR POLICE.					
First-class sergeants	4				4
First-class roundsmen	2				2
First-class patrolmen	20	3		1	24
Third-class patrolmen	12	1			13
LAUNCH CREW.					
Master		1			1
Mate	1				1
Engineers	2				2
Firemen	4				4
Sailors	11	1			12
SECRET SERVICE BUREAU.					
Employees	24	1			25
OFFICE FORCE.					
Chief clerk	1				1
Property clerk	1				1
Clerks and interpreters	12				12
Messengers	2				2
Station interpreters	3				3
Total	780	43	7	7	941

Special native police, 104.

Report of prisoners apprehended by police department, exclusive of secret service, covering the period from August 7, 1901, to September 30, 1902, inclusive.

Assault	795
Assault and battery	470
Attempted robbery	13
Attempted rape	21
Abduction	31
Abortion	1
Abandon his vehicle	102
Attempt to defraud	15
Attempted murder	31
Assault with intent to kill	10
Accomplice in murder	5
Attempted suicide	1
Adultery	24
Arson	2
Aggravated assault	15
Attempted housebreaking	1
Attempted bribery	2
Accessory to theft	1
Attempted burglary	1
Attempt to kill	1
Attempted assault	1
Bribery	77
Begging	10
Blocking the highway	678
Blocking sidewalk	10
Bigamy	3
Blocking a waterway	32
Burglary on the high seas	4
By order of the captain of the port	2
Cochero not registered	75
Criminal assault	1
Criminal negligence	4
Contempt of court	27
Conducting gambling house	98
Cockfighting on public street	26
Cooly occupying sidewalk	22
Committing nuisance	518
Cruelty to animals	652
Conducting a house of prostitution	2
Counterfeiting	8
Conspiracy	4
Corruption of morals	1
Carrying concealed weapons	43
Conducting a lottery	9
Collector for gambling	4
Curtains in front of store below limit allowed by law	1
Drunk	402
Drunk and disorderly	943
Disorderly conduct	2,219
Disobeying an officer	68
Driving on the Escolta during prohibited hours	25
Defacing United States flag	1
Driving from rear seat of carromatta	96
Deserting a passenger	3
Disorderly house	1
Defacing public property	6
Bill posting without license	32
Burglary	21
Deserter from U. S. Army	7
Deserter from U. S. Navy	5
Deserter from Russian army	3
Deserter from U. S. C. transport	2
Deserter from merchant marine	6
Embezzlement	269
Escaped prisoner	44
Extortion	39
Ear cleaning on public street	8
False accusation	5
False pretenses	16
False weights and measures	2
Fraud	11
Forgery	13
Felonious assault	1
Fast driving	32
Frustrated assault	1
Gambling	2,492
Grand larceny	15
Grave assault	4
Grave injury	1
Homicide	2
Held as witness	31
Housebreaking	14
Held for safekeeping	176
Highway robbery	3
Held awaiting orders from the British consul on charge of mutiny	11
Held awaiting warrant from court of first instance	6
Detention	23
Deserter	12
Impersonating license inspector	3
Impersonating an officer	5
Inferfering with an officer	17
Impersonating a S. S. officer	10
Illegal detention	45
Injuries	2
Infanticide	3
Kidnapping	1
Katipunan	1
Keeping a vicious dog	1
Keeping unlicensed firearms	2
Larceny	907
Leper	2
Ladrones	3
Murder	45
Malicious mischief	17
No license for an exhibition	7
No lights on vehicle	297
No signal on vehicle	542
No license for vehicle	277
Not occupying public station	322
No tariff in vehicle	32
No badge on cochero	10
No number on vehicle	89
No dog license	6
Not reporting a death to the board of health	1
Neglect of duty	2
No lights in front of house	2
Indecent exposure	91
Insane	21
Impersonating a policeman	19
Impersonating a health officer	1
Impersonating customs inspector	1
Impersonating sanitary inspector	14
Perjury	6
Prostitutes	30
Peddling without license	265
Pickpocket	5
Petty larceny	40
Passing illegal money	1
Reckless negligence	6
Reckless driving	262
Reckless bicycle riding	6
Robbery	93
Refused to be vaccinated	14
Resisting an officer	16
Refused a fare	527
Rape	36
Receiving stolen goods	34
Refused to pay cochero	1
Resisting arrest	3
Suspicious character	478
Stowaway	2
Suspected of larceny	3
Swindling	7
Selling impure food	37
Selling without license	5
Soldier out of quarters after hours	1
No license for bicycle	8
No light on bicycle	1
No license card in vehicle	27
Overcharging a fare	43
Obtaining money under false pretenses	29
Theft	305
Threats	2
Threatening to kill	13
Trespassing	13
Traffic in girls for the purpose of prostitution	5
Unlawful practice of medicine	1
Usurpation	1
Vagrancy	533
Violation of license regulations	194
Violation of police regulations	183
Violation of sanitary regulations	395
Violation of quarantine regulations	433
Violation of barber regulations	17
Violation of harbor regulations	2
Violation of immigration regulations	16
Violation of building regulations	29

Report of prisoners apprehended by police department, exclusive of secret service, covering the period from August 7, 1901, to September 30, 1902, inclusive—Continued.

Violation of vehicle regulations	21	Soliciting for a lottery	5
Violation of park regulations	13	Suspected of treason	1
Violation of lodging-house regulations	13	Selling vino to soldiers	17
Violation of public-pound regulations	2	Warrant from constabulary	7
Violation of street-advertising regulations	8	Smuggling	6
Violation of excise laws	65	Suspected Katipunan	1
Warrant M. C., north of Pasig	8	Suspected insurgent	3
Warrant M. C., south of Pasig	7	Selling opium to natives	6
Suspected of murder	4		
Shooting an officer	1	Total	18,042
Suspected of poisoning	2		

RECAPITULATION.

Males	16,225
Females	1,817
Americans	2,014
Spaniards	67
Natives	13,386
Chinos	2,355
Europeans	149
Japanese	71
Total	18,042
Enlisted men of the U. S. Army	172
Enlisted men of the U. S. Navy	5
Enlisted men of the U. S. Marine Corps	3
Deserters from merchant marine	6

Statement showing arrests made by the secret-service bureau during the period August 7, 1901, to September 30, 1902, inclusive.

False swearing	1	Other causes	1
Adultery	2	Warrant supreme court	10
Larceny	409	Drunk and disorderly conduct	3
Conducting gambling games	9	Suspected murders	6
Selling opium to Americans	3	Insubordination on high seas	2
Receiving stolen goods	29	Carrying concealed weapons	5
Attempting to pass Confederate money	2	Request of sheriff	1
Assault and attempted assault	12	Reckless driving	1
Begging	3	Soliciting	2
Selling liquor on Sunday	1	Violation of city ordinance	6
Impersonating public officer	1	Violation of liquor license	4
Vagrancy	202	Passing forged check	1
Extortion	14	Warrant, municipal court	5
Violation of health regulation	3	Refusing a fare	1
Peddling without license	3	Accomplice to larceny	5
Violation of excise law	9	Treason and sedition, Katipunan	21
Burglary	4	Request of constabulary	4
Attempted bribery	2	Violation of customs act	1
Drunk and disorderly	4	Disorderly house	1
Robbery and frustrated robbery	23	Bribery and larceny	2
Request of provincial governor	4	Cruelty to animals	1
Smuggling	2	Running pawnshop without license	2
Obtaining goods under false pretenses	3	Abduction	4
Order court first instance	2	Escaped prisoners	42
Forgery	8	Coercion	2
Pickpocket	1	Accessory to murder	1
Accepting bribe	2	Treason suspect	1
Desertion	44	Swindling	9
Counterfeiting	5	Warrant	20
Suspect	91	Insurgent	1
Wanted by military authorities	3	Interfering with officer	3
Passing counterfeit and illegal money	4	Burglary and assault	4
Receiving stolen property	2	Rape	3
Kidnaping	2	Detaining girls for immoral purposes	8
Violation immigration law	1	Collecting for gambling, "jueting"	10
Insurgent	2	Perjury	1
Embezzlement	58	Highway robbery	1
Trespassing	4	Obtaining money under false pretenses	4
Gambling	75	Robbery and assault	4
Selling liquor without license	2	Request of foreign consul	4
Murder	24	Illegal landing of Chinese	11
Held as witness	7	Estafa	14
Fraud	10	Insane	2
Allowing prisoners to escape	2	A. W. O. and breaking arrest	1
Assault with deadly weapon	7	Homicide	1
Bribery	8	Violation of liquor act	4
Disorderly conduct	5		
Criminal negligence	1	Total	1,356

Statement showing arrests made by the secret-service bureau during the period August 7, 1901, to September 30, 1902, inclusive—Continued.

RECAPITULATION.

Convicted	725	Bail forfeiture	1
Released	240	Held by civil government	1
Turned over to proper authorities	205	Returned to prison	2
Dismissed	112	Pending	40
Escaped	6		
Hospital	2	Total	1,356
Charges withdrawn	2		
Discharged	19	Total money recovered	$3,991.33
Held as witness	1	Total property recovered	12,482.74

Law Department.—In this department are included the office of the city attorney and city prosecuting attorney, and it is the link between the municipal courts, the courts of the peace, and office of the sheriff of Manila in their relations with the municipal board.

City of Manila, Office of City Attorney,
Manila, P. I., October 25, 1902.

The Secretary of the Municipal Board,
Manila, P. I.

Sir: I have the honor to submit the following report of the operations of the law department of the city from its organization to and including September, 1902.

OFFICE OF THE CITY ATTORNEY.

Investigations, generally among the old Spanish insular and municipal archives, and resulting reports to the municipal board and the various city departments	132
Legal opinions rendered to the municipal board and various city departments (these are written opinions; in addition numerous oral opinions have been rendered concerning matters of current business)	225
Ordinances prepared for the action of the municipal board	52
Acts prepared for the action of the Philippine Commission	8
Bonds, contracts, deeds, leases, etc., prepared and submitted to the municipal board	87
City land titles cleared and registered	8
Suits attended to	14

Eight of the above suits were brought against the city. In three of these no hearing has yet been had; in the fourth three successive motions made by the plaintiff for an interlocutory injunction have been denied, a demurrer to the complaint has been sustained, the complaint has been three times amended, and, as finally amended, demurred to; in the fifth an interlocutory judgment was issued ex parte, vacated, and reissued restraining the city from enforcing one of its ordinances, and the case is now in the supreme court on appeal; in the sixth there has been two trials, once before a justice of the peace and later in the court of first instance, and both courts held that the plaintiff had no action against the city; in the seventh the plaintiff introduced his proofs and rested his case on July 10, whereupon the city moved for judgment on the ground that the proofs failed to sustain certain essential allegations of the complaint, and the court has this motion still under consideration; and in the eighth the plaintiff's application for an interlocutory injunction against the city has been denied.

Each of the six suits in which the city is plaintiff were brought to recover real property claimed by the city. In two of these no hearing has yet been had; in the third a settlement was reached by the defendants paying damages and costs and acknowledging the city's title to the land in question; and in the fourth, fifth, and sixth demurrers interposed by the defendants to the complaints have been overruled.

A large portion of the time of the office is consumed in investigations and the preparation of opinions and reports in which the acts of the old Spanish insular and municipal officials are involved, the loss or mutilation of about half of the city archives in 1898 making such investigations very difficult. This is particularly true of investigations into the city's titles to real estate, since it was not the custom of the Spaniards to register city titles. Of the numerous claims formally presented against the city, some have their origin prior to the establishment of the present city government and some originating more recently; an adverse opinion has been rendered, after investigation, with few exceptions, generally resulting in the abandonment of the claim by the claimant without legal proceedings. The only decision secured against the city was in the case in which the injunction was granted as above stated, and that was promptly carried to the supreme court on appeal.

OFFICE OF THE PROSECUTING ATTORNEY.

The work accomplished by this office was as follows:

Cases instituted in the municipal courts	442
Cases instituted in the courts of first instance	214
Total	656
Disposition of municipal court cases:	
Convictions	188
Dismissals	48
Acquittals	59
Remanded to court of first instance	61
No record of disposition obtainable	61
Appealed to court of first instance	11
Bail forfeited	3
Defendant not found	4
Turned over to military authorities	1
Complaints not sworn to	2
Turned over to provinces	2
Pending	2
Total	442
Cases in court of first instance:	
Cases originating in courts of first instance	214
Remanded from municipal courts	61
On appeal from municipal courts	13
On appeal from municipal courts (not originating in the prosecuting attorney's office)	30
Total	318
Disposition of cases in courts of first instance:	
Convictions	137
Dismissals	53
Acquittals	36
Escaped before trial	5
Remanded to municipal courts	2
Defendant not arrested	1
No record of disposition obtainable	11
Transferred to court of customs appeals	2
Bond forfeited	2
Pending	69
Total	318
Number of letters written	504
Number of letters received	278
Number of deaths investigated as coroner	34

While the number of cases in the municipal courts was seemingly large, in a great percentage of them the work of the prosecuting attorney's office was confined to the preparation of complaints. This is due to the fact that both the police department and the secret-service bureau are becoming able to handle a great many cases in the municipal courts and the fact that the constantly increasing work in the courts of first instance keeps the entire force of the prosecuting attorney's office busily employed.

OFFICE OF THE SHERIFF.

The processes receiving the attention of this office were as follows:

Summons, with copies of complaint, served	1,777
Citations for witnesses	2,558
Executions received and disposed of	287
Attachments levied	64

Attachments released	39
Orders of ouster and restitution	102
Orders to take possession of property	7
Orders to deliver property	6
Orders to take possession of person	1
Orders to vacate	2
Orders to recover	2
Orders to complete contract	1
Orders to render accounts	6
Orders to show cause	16
Orders to deposit children	3
Orders of injunction	14
Orders to render inventory	1
Orders to suspend execution	1
Notifications of garnishee	27
Notifications to hold property	8
Notifications with copies of petitions	35
Notices of appeal	1
Arrests	144
Assessors summoned	22
Sales advertised	49
Sales of personal property made	11
Sales of real estate made	1
Search warrants	4
Writs of mandamus	1
Writs of habeas corpus	50
Writs of replevin	2
Filing process with registrar	1
Total	5,243

MUNICIPAL COURT NORTH OF PASIG.

Total number of cases	8,345
Total number of persons tried	10,909
Cases sent to court of first instance	149
Number of persons fined, 6,711; number sentenced to Bilibid, 639; total number of persons convicted	7,597
Number of persons sent to Bilibid for nonpayment of fine	1,008
Offenses:	
Violation of ordinances relating to public vehicles	1,614
Violation of ordinances relating to public streets and places	189
Drunk and disorderly	750
Disturbing the peace by fighting	1,357
Disturbing the peace by throwing stones	19
Disturbing the peace by shouting	75
Gambling	1,941
Assault	1,003
Obstructing streets and sidewalks	256
Committing nuisances	121
Reckless riding and driving	205
Vagrancy	392
Cruelty to animals	354
Violation of license regulations	433
Violation of sanitary regulations	747
Violation of Manila liquor law	15
Destruction of property, posting bills, begging, resisting arrest, etc	415
Larceny	546
Embezzlement	260
Assault and battery	193
Unlawful detention	7
Bribery	4
Entering a house without permission	3
Search warrants issued	14
Race and sex of persons convicted:	
Filipinos, male	7,243
Filipinos, female	1,247

Race and sex of persons convicted—Continued.	
Chinese, male	1,472
Chinese, female	2
Americans, male	817
Americans, female	5
Spaniards, male	29
Spaniards, female	5
Japanese, male	22
Other nationalities, male	59
Other nationalities, female	5
Japanese, female	3

Collections from fines and forfeitures (approximate) $44,200 United States currency.

MUNICIPAL COURT SOUTH OF THE PASIG.

Total number of cases	4,812
Total number of persons tried	6,216
Cases sent to court of first instance	67
Offenses:	
Violation of ordinances 10 and 11, regulating the use of streets and public vehicles	989
Drunk and disorderly, disturbing the peace, etc	1,025
Gambling	522
Assault	295
Committing nuisances	170
Vagrancy	153
Cruelty to animals	140
Violation of ordinances relating to licenses (other than liquor licenses)	121
Violation of ordinances relating to sanitary regulations	123
Disobeying police officer, resisting arrest, malicious mischief, carrying concealed weapons, etc	175
Larceny	403
Receiving stolen goods	28
Bribery and attempted bribery	29
Impersonating police	13
Reckless driving and riding	145
Race and sex of persons convicted:	
Filipinos, male	4,167
Filipinos, female	388
Chinese, male	12
Chinese, female	0
Americans, male	88
Americans, female	1
Spaniards, male	4
Spaniards, female	0
Other nationalties, male	8
Other nationalties, female	0

Collections from fines and forfeitures, $46,103.56 United States currency.

JUSTICES OF THE PEACE.

The matters disposed of in these two courts were as follows:

Suits for recovery of sums of money	700
Suits to recover possession of real property	461
Compromises adjusted	39
Affidavits taken	207
Marriages solemnized and certificates issued	65
Marriages registered	2,077
Deposits of money received	80
Family council legalized	4
Suits to secure the return of personal property	38
Suits for damages	2
Suits for specific performance	1
Total	3,674

Collections, costs, and fees, $4,264.61 Mexican currency.

Very respectfully,

W. L. Goldsborough,
City Attorney.

FIRE DEPARTMENT.

On August 7, 1901, when the city of Manila was organized under act No. 183 of the United States Philippine Commission, the fire department was separated from the department of streets, parks, fire, and sanitation and formed into a distinct department, all equipment and apparatus relating to the department being turned over. F. R. Dodge was appointed chief, with J. W. Hoey as his assistant. Upon the resignation of F. R. Dodge as chief of the department on October 25, 1901, a request was made to the civil service board to furnish the name of a competent and experienced chief. In answer to this the name of Hugh Bonner, late chief of New York City, was submitted, and he was appointed on December 28, 1901, taking charge of the department April 25, 1902. Between the date of resignation of F. R. Dodge and the arrival of Chief Bonner the department was in charge of Assistant Chief Hoey.

The membership of the department at the present time consists of 1 chief of department, 1 deputy chief, 1 chief engineer, 1 electrician, 2 clerks, 2 linemen, 5 captains, 5 lieutenants (native), 4 engineers (native), 15 drivers, 3 drivers (native), 29 pipemen (native), 11 truckmen (native). This is a total of 80 men.

ORGANIZATION.

The force is organized into four engine companies and one hook and ladder company, which are equipped as follows:

Hook and Ladder Company No. 1, Tanduay fire station.—Organized August 1, 1902, carrying 158 feet of ladders, drawn by 2 horses; 1 extra hose wagon, carrying 1,000 feet of hose, drawn by 2 horses. Personnel: One captain (American), 1 lieutenant (American), 13 firemen (4 American and 9 native).

Engine Company No. 1, Santa Cruz fire station.—One steam fire engine, drawn by 2 horses, "Merryweather," London, England, make, about 400 gallons capacity and in fair condition; 1 hose wagon, drawn by 2 horses, carrying 1,000 feet of hose. Personnel: One captain (American), 1 lieutenant (native), 1 engineer (native), and 15 firemen (4 American and 11 native).

Engine Company No. 2, Santa Cruz fire station.—One steam fire engine, drawn by 2 horses, "Shand, Mason & Co.," London, England, make, about 400 gallons capacity and in fair condion; 1 hose wagon, drawn by 2 horses, carrying 1,000 feet of hose. Personnel: One captain (American), 1 lieutenant (native), two engineers (native), and 6 firemen (4 American and 2 native).

Engine Company No. 3, Paco fire station.—One manual engine, drawn by 2 ponies. This machine is very old, but the pump is in fair condition. One hose wagon, drawn by 2 horses, carrying 1,000 feet of hose; 1 two-wheeled supply cart, drawn by 1 pony, used to convey an extra supply of coal to fires occurring in the district. Personnel: One captain (American), 1 lieutenant (native), and 10 firemen (3 American and 7 native).

Engine Company, No. 4, Manila fire station.—1 portable steam engine, drawn by hand, about 25 gallons per minute capacity, and in fair condition; 1 two-wheeled cart, drawn by 1 pony, used to carry about 450 feet of hose, and in fair condition; 1 two-wheeled supply cart, drawn by 1 pony, used to carry coal, play pipes, wrenches, etc. Personnel: 1 captain (American), 1 lieutenant (native), 1 engineer (native), and 14 firemen (native).

In all 6,000 feet of hose is distributed amongst the different companies, all of which is in first-class condition.

FIRE STATIONS.

Tanduay fire station, located at the junction of calles Concordia and Romero Aquino, Quiapo district, is occupied by Hook and Ladder Company No. 1. The sanitary condition of this building is good. The following improvements have been made by the members of the company: The front entrance of the apparatus house has been widened. Four stalls have been built on the apparatus floor to accommodate the teams used on the hook and ladder truck and the extra hose wagon in service at the station. The inside court was leveled and graveled. The department of engineering and public works installed thirteen incandescent lights and completed a bath and lavatory room, the drainage being conducted to a cesspool constructed on the Rome Aquino street side of the station. A telephone was installed having connection with the central telephone office, the request from this department to have the connection made direct with the central switchboard of this department at the Santa Cruz station not being complied with, thus necessitating a delay of from five to fifteen minutes in transmitting an alarm to this station from the central station at Santa Cruz.

Santa Cruz fire station, located at the junction of Calle Alcala and Enrile, Santa Cruz district, accommodates the headquarters office, the office of the city electrician, and engine companies Nos. 1 and 2. The sanitary condition is good. The following improvements have been made in the station by department skill and labor: Room fitted up with loft or upper floor, and shelving to accommodate department supplies; a storage room for forage, and room for use as a general repair and blacksmith shop. A concrete floor with cement finish has been put in the hose tower. The stone floor in the stalls of the stable in the rear of the station has been removed and replaced with gravel. A plank runway 7 feet wide by 15 feet long, underlaid with concrete, has been placed on the apparatus floor for the use of Engine Company No. 1. Four stalls are being built for the use of the same company, 2 of which are nearly completed. These stalls will have cement drainage connection with the sewer. The granite stone floor of this room has been entirely taken up preparatory to making the floor of rubble and cement. The department of engineering and public works completed the bathroom and lavatory, with sewer connections, and installed 14 additional incandescent electric lights.

Paco fire station, located on Calle Nozaleda (opposite Paco cemetery), Paco district, is occupied by Engine Company No. 3. The sanitary condition is good. The members of this company have made the following improvements: The entire floor has been raised and recemented. An inclosed shed has been erected at the rear of the station to accommodate one piece of apparatus and an outside closed shed has been constructed to stall 8 horses. The entire interior of the fire station has been rearranged, the walls whitewashed, and the woodwork repainted and retinted. A board floor has been put in the stalls on the apparatus floor and a concrete floor placed in the feed room. Lockers for the use of the men were made and placed in position. The department of engineering and public works installed three additional incandescent lights, and has commenced the erection of a frame structure to accommodate a chemical engine and two horses, with sleeping apartments for the men necessary to man the apparatus.

Manila fire station, located in the ayuntamiento building on Calle Aduana, Intramuros, is occupied by Engine Company No. 4. Two rooms, with a street entrance to this building, are occupied by the engine company mentioned. The sanitary condition is good. A building at the junction of Calles Aduana and Audencia, Intramuros, is being reconstructed by the department of engineering and public works for use as a fire station and when completed the rooms in the ayuntamiento will be vacated.

HORSES.

Great difficulty has been experienced in purchasing good fire horses on account of the lack of material to select from. Most of the horses purchased have been unbroken, and it has taken considerable time to fit them for their work. In some cases they have been found to be entirely unsuitable as fire horses and exchanges have been made with other departments of the city. All horses have received the best of care and have been well trained by those in charge of them. Many of them, after a month's training, will answer promptly to a call and take their places at the pole of the apparatus. The horses at present in the service are as follows:

American	27
Australian	2
Native	13
Total	42

Losses.—July 7, one American horse, destroyed by veterinarian, board of health, the horse suffering from a compound comminuted fracture of the right metacarpal bone. August 23, one American horse, died with enteritis.

APPARATUS.

The apparatus, as turned over by the former city government, has been entirely inadequate for the needs of the city, and its condition is very poor. All possible steps have been taken to improve the condition of the department from its organization, and on January 27, 1902, a contract was entered into by the insular purchasing agent for the following apparatus, at a cost of $35,338, United States currency, viz:

Two "Metropolitan" steam fire engines, capacity 700 gallons per minute, with Fox tube boilers, complete, with implements, tools, and apparatus; four chemical engines; improved double-cylinder, horizontal, four-wheeled carriage, capacity 80 gallons per cylinder, system carbonic-acid gas, complete, with tools, appliances, and instruments.

The tests of these engines were held on September 23, 1902, and they proved highly satisfactory, the engines coming up to the standard required by the contract. The hook-and-ladder trucks, 4 two-horse hose wagons, 1 chief's buggy, 6,000 feet of hose, 15 sets of harness, and a numerous assortment of miscellaneous appliances. Of this new apparatus, under the head of "organization," is shown the disposition of all except three chemical engines, which are at present stored in the new station at the corner of Calles Aduana and Audencia, Intramuros, awaiting the completion of the new stations in San Nicolas, Paco, and Intramuros.

FIRE-ALARM SYSTEM.

The fire alarms throughout the city are at present received over the telephone system now in use by the Manila Telephone Company, on which the department has been entirely dependent for receiving fire alarms. It is needless to say that the service is of the most inferior class and not to be depended upon at any time when required for use to announce fire alarms from a distance. There is usually a great delay before these messages are received at the fire stations, with the result that before any of the apparatus can arrive at the scene of the fire it has obtained great headway, usually causing great loss to buildings and stock. In this connection may be cited the question of the destruction of the warehouse of the Pacific and Oriental Trading Company at the corner of Calles Arlequi and Duque de Alva, Quiapo, when great delay in transmitting the alarm was apparent, as the sky was brightly illuminated by the reflection of the fire previous to the alarm being sent to the central fire station. The alarm was received in the usual slow method over the telephone. On the arrival of the department at the fire, the entire building was one mass of flames bursting through the roof and the four sides of the structure, seriously endangering property of great value in the immediate vicinity. Had the new fire-alarm system been in operation at that time the fire referred to would not have obtained the headway it had when the alarm was received.

On October 26, 1901, requisition was made on the insular purchasing agent for a complete fire and police alarm system to be purchased from the Gamewell Fire and Police Alarm Company. This alarm system consists of eighty boxes and all the appliances necessary for the installation and operation of the system, including a large steam whistle which will be operated at the insular cold storage and ice plant. This system will be completed within the next quarter, and it is hoped that it will render sufficent service in reducing to a great extent the amount of losses by fire annually occurring in the city. The system will be equal to any yet devised and will represent the latest improvements in appliances for transmitting and announcing alarms of fire from a distance. The city will then be well protected against fire, and this should be the means of lowering fire insurance rates, which at the present time are high considering the record of fires during the past year.

CONSTRUCTION OF THE FIRE AND POLICE ALARM SYSTEM.

The construction of this system, which is under the direct supervision of the city electrician, was commenced July 22, 1902. In this construction the use of the Electric Light Company's and the Signal Corps' poles has saved the city considerable expense, but not as much as was calculated upon before the construction was commenced. A great many of the Electric Light Company's poles have been found to be too weak and rotten for the use of the department, and for that reason a number of extra poles have been purchased. Many difficulties have been encountered on account of the bad condition of the wires already strung throughout the city and the necessity of placing the wires of this system so that they will not be in danger from contact with them. The method of construction of buildings has also increased the difficulties, as the overhanging upper stories have made it impossible to place poles on the curb line and give sufficient space between them and the adjoining building, and so it has been necessary to install poles of sufficient height to carry the wires over the buildings instead of by the sides of them.

During the month of July there were employed 2 American linemen and 33 native laborers; in August, 2 American linemen and 37 laborers; in September, 2 American linemen and 37 native laborers.

Up to the 1st of October, 142 new poles were erected; 2,100 cross arms were placed on United States Signal Corps and electric-light poles, necessitating the molding of 8,102 lead screws or pins for receiving the glass insulators.

During the month of August 6 wires, complete, were run from a point near the insular cold storage and ice plant to the fire station on Calle Nozaleda, Paco district. Four wires, complete, were run from the Paco fire station on Calle Nozaleda, to a point at the end of Calle Real, Malata, via Calles Faura and Nueva, Ermita. Pole brackets were adjusted to electric-light poles along Calles Lacoste and Misericordia, Santa Cruz district, along Calle Iris to Sampaloc police station, and from the corner of Calles Misericordia and Lecoste along Calle Azcarraga to the Manila and Dagupan railway station.

In September wires were run from the Santa Cruz station, as follows: Sixteen to Parian police station, 5 to Plaza Goiti, and 7 to Sampaloc police station; 4 wires from the latter station to Rotunda and Santa Mesa road; 4 wires along Calle Guipit to Balic Balic; 4 wires from Sampaloc along Calle Tanduay to Novaliches to Uli Uli; from Novaliches to General Solana. Poles were erected on Calle San Miguel to Calle Echague.

WATER SUPPLY.

The natural pressure of water in the mains is of very little use in the fighting of fire without the assistance of engines. Hydrants in the streets are old and worn-out and should be replaced as soon as practicable by modern fire plugs. The mains are for the most part small and insufficient for the proper protection of the city from fire.

The esteros of the city have been found very serviceable in furnishing water and remedy to some degree the lack of the necessary supply from the mains. These esteros cover only a portion of the city and in the districts of Intramuros, Ermita, and Malate, where there are none; the water supply would be insufficient in case of a large fire. The four chemical engines will be of great assistance in supplying this deficiency, and it is thought that many of the fires will be extinguished by this means when the alarm system is put into service and the apparatus can be put on the scene of the fire before too much headway has been gained. The need of an enlarged system of water supply is very evident and it is hoped that some improvement can be made in this direction in the near future.

FIRES.

From August 1, 1901, to the end of the fiscal year the department responded to 47 alarms of fire. The total amount of damages resulting from these fires was $25,042.50 United States currency, covered by insurance amounting to $69,500 United States currency. From July 1 to September 30 there were 17 alarms, and the loss in these fires amounted to $243,999.58 United States currency, covered by insurance amounting to $432,083.34 United States currency.

During the past year the number of fires was remarkably small considering the extent of the city and the large number of buildings of light material, which, in addition to the little care that is taken by the inhabitants to protect themselves and their property from such accidents, makes the chance of fire very great.

During the year the department has been called upon by the board of health to supervise the destruction of infected nipa shacks which have been condemned by them as insanitary, the presence of the fire department being required to prevent the spread of fire from these shacks to adjoining property. This was accomplished by the department whenever called upon.

In the month of May the town of Malabon was visited by a destructive fire, which had gotten beyond the control of those who were endeavoring to extinguish it. The department, in response to an urgent request from General Wheaton to send men and apparatus immediately to Malabon, the fire having gotten beyond the control of the local authorities, immediately sent men and apparatus to the scene of the conflagration in time to render efficient aid in checking the spread of the flames. This was done at a considerable risk to this city, as it drew from the city at least one-third of the active force for many hours, the means at the disposal of the city for its own protection being inadequate. (For detailed report of fires see Exhibit A.)

ELECTRICAL INSPECTION.

The city electrician and the men under his charge have made a thorough inspection of all buildings in which electricity has previously been installed without proper inspection. The work of installation was done indiscriminately by parties who claimed to have knowledge and experience in such work, inferior electrical conductors being used, thereby jeopardizing much valuable property, which would not have been the case if proper installations had been made and the work supervised by government inspectors. In all cases where electric lights are to be installed, permits must be obtained from the city electrician and all work must comply strictly with the requirements of the National Board of Fire Underwriters of the United States and be installed subject to inspection and approval under these regulations.

On September 26, 1902, an ordinance was enacted by the municipal board which relates to the sale and supply of electricity and telephone service and the inspection and installation of electric wires, meters, and other apparatus. This ordinance requires the inspection by the city of all meters in measuring the supply of electricity from the electric light company. This work will entail some outlay in the way of apparatus for the proper testing of these meters. It will also require additional assistance for a thorough inspection of electrical installations throughout the city. The city has not been able to enforce all requirements necessary for safety and good order in the public streets, as pertains to electric wires and apparatus, on account of there being no law or regulations in force in the city of Manila which fully covered this point.

During the period from August 7, 1901, to June 30, 1902, 712 permits were granted and the work done on these permits inspected by the city electrician, for which the amount of $951.50, United States currency, was paid. From July 1, 1902, to September 30, 1902, 687 permits and certificates of inspection were issued, for which $374, United States currency, was received.

PROJECTED IMPROVEMENTS.

A new fire station is in course of construction in the district of San Nicolas, at the corner of calles Madrid and San Fernando, and will be modern in every respect. It will accommodate an engine company, hook and ladder company, and chemical engine, this proving ample protection to this district, which is one of great importance on account of the government buildings and a large number of warehouses belonging to private firms.

The building at the corner of calls Aduana and Audencia, formerly used by the street department as a warehouse, is being remodeled for use as a fire station, and when completed will be capable of housing three companies. This station will be a very important one, on account of the new port works and the large number of buildings and warehouses that will necessarily be constructed there in the near future.

The necessity for a wide opening in the wall on this side of the city is very apparent, as at the present time the narrow gates are not of sufficient width to allow of the passage of fire apparatus even at a slow rate of speed, and it is hoped that the new gate, for which plans have been drawn up, will be constructed in the near future. This will allow of the passage of apparatus from the central station through the Walled City, or the passage of apparatus from the station within the Walled City to any part of Manila in case of large fires, where it is found necessary to use more companies than the ones stationed in the immediate vicinity.

Plans have been drawn up for a central fire station to be located near the southern approach to the Santa Cruz bridge in a piece of ground formerly a part of the botanical gardens. This location is all that could be desired for a central station, as it makes it possible to have the company stationed in it to reach all parts of the city and to assist local companies when found necessary. The present quarters at Santa Cruz station are not ample for the headquarters of the fire department, and it seems absolutely necessary to push this work as rapidly as possible. When this station has been constructed there will be a total of six stations in the following districts, viz, Ermita (central station), Intramuros, San Nicolas, Santa Cruz, Paco, and Quiapo, being so distributed as to protect thoroughly all the districts of the city.

THEATERS AND PLACES OF AMUSEMENT.

At present there is no ordinance in force in the city of Manila for the regulation of theaters and places of public amusement and for protection against fire. However, an ordinance is now under consideration for the necessary regulation of these places. These buildings in most cases are old and are all built of inflammable materials which makes it very necessary that they provide themselves with some means of extinguishing fires, and that better provision should be made for exits, and the arrangement of the seats be such that the house can be emptied in the shortest possible time. At all public entertainments there are one or two firemen detailed from the department with the necessary hose or chemicals, as the case may be, for the extinguishing of fire and to prevent, if possible, any fire gaining sufficient headway to be of danger to the public.

INSPECTION OF BUILDINGS.

Many old, dilapidated, and dangerous structures existing in this city, the occupants of which formerly permitted violations to exist that were likely to cause fire on their premises, and thereby endanger surrounding property, have been thoroughly inspected, and all such violations removed when found to exist.

INSPECTION OF BOILERS.

Inspection of all buildings using steam boilers has been continued from time to time and where such boilers were found to be in close proximity to exposed woodwork, or danger of any kind likely to cause a fire on the premises, all such violations have been removed after allowing sufficient time to elapse in which to remedy such defect when found to exist.

EXPLOSIVES AND COMBUSTIBLES.

The existing laws require the fire department to supervise and regulate the manufacture, storage, and use of petroleum, gas, acetyline, gunpowder, and other highly explosive and combustible matter. This is a very important matter and requires immediate attention, as high explosives will undoubtedly find a market in this city in the near future. To this end ordinances for the proper control and regulation of the manufacture and storage of such materials are under consideration and both the place and manner of storing them will be regulated.

Receipts and expenditures.

	United States currency, Aug. 7, 1901, to June 30, 1902.	Local currency, July 1, 1902, to Sept. 30, 1902.
Salaries and wages	$26,492.51	$16,050.19
Equipment and fire apparatus	8,157.34	851.95
Horses	2,112.00	....
Stationery and office supplies	776.89	406.18
Contingent expenses	2,661.36	291.04
Transportation	102.38	....
General supplies	2,869.57	6,327.14
Forage	2,390.90	....
Fire-alarm installation	27.42	11,893.75
Total	45,590.37	35,820.25
Receipts for electrical installations	....	1,399.00

NOTE.—All accounts for the fiscal year 1903 being kept in local currency, the amount of expenditures for the quarter ending September 30 is so shown.

This statement does not show the purchase of the new apparatus nor the apparatus of the alarm system, which amount to approximately $35,338, United States currency, and $37,500 United States currency, respectively. These accounts will be paid as soon as the tests of apparatus have been completed.

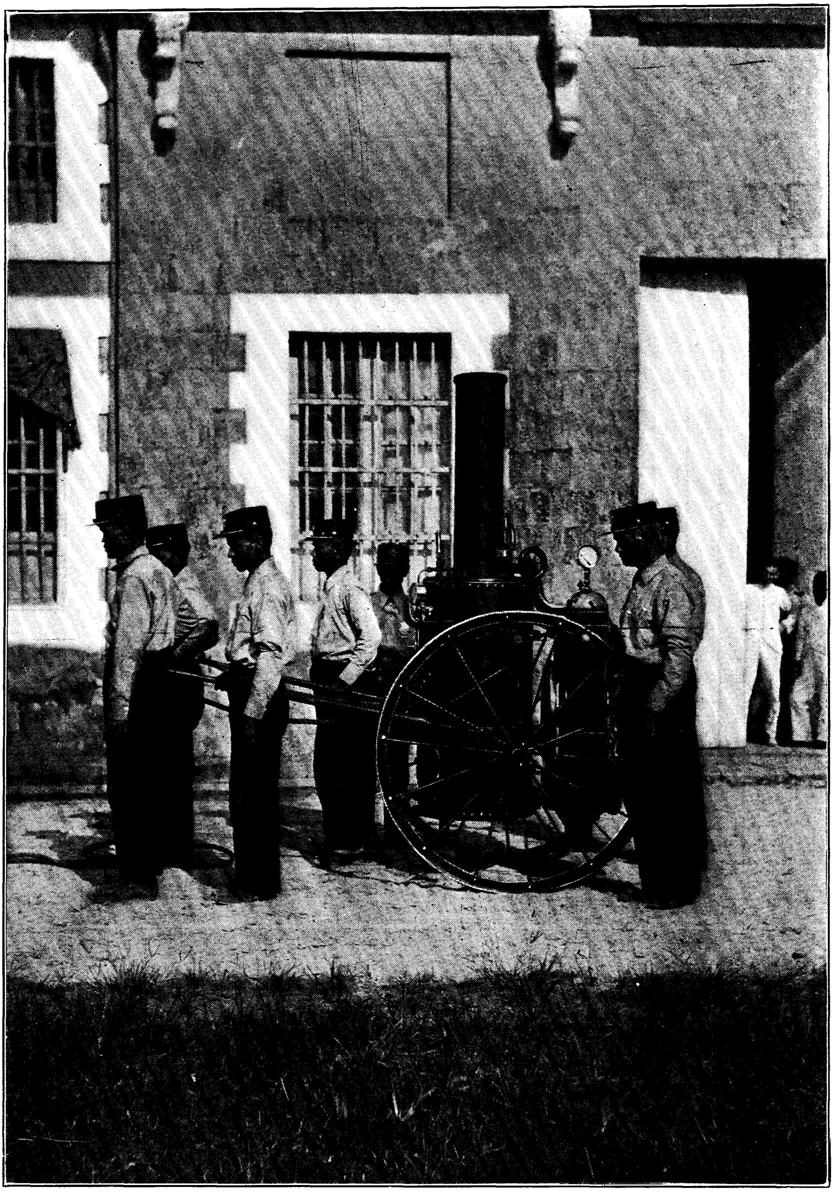
UNIFORMS.

The uniform of the department is unsatisfactory, as it is the same as that used by departments in the United States and is unsuitable for the Tropics. The chief is endeavoring to find some light and durable material for this purpose, and as soon as it has been decided upon the uniform will be changed to something more serviceable.

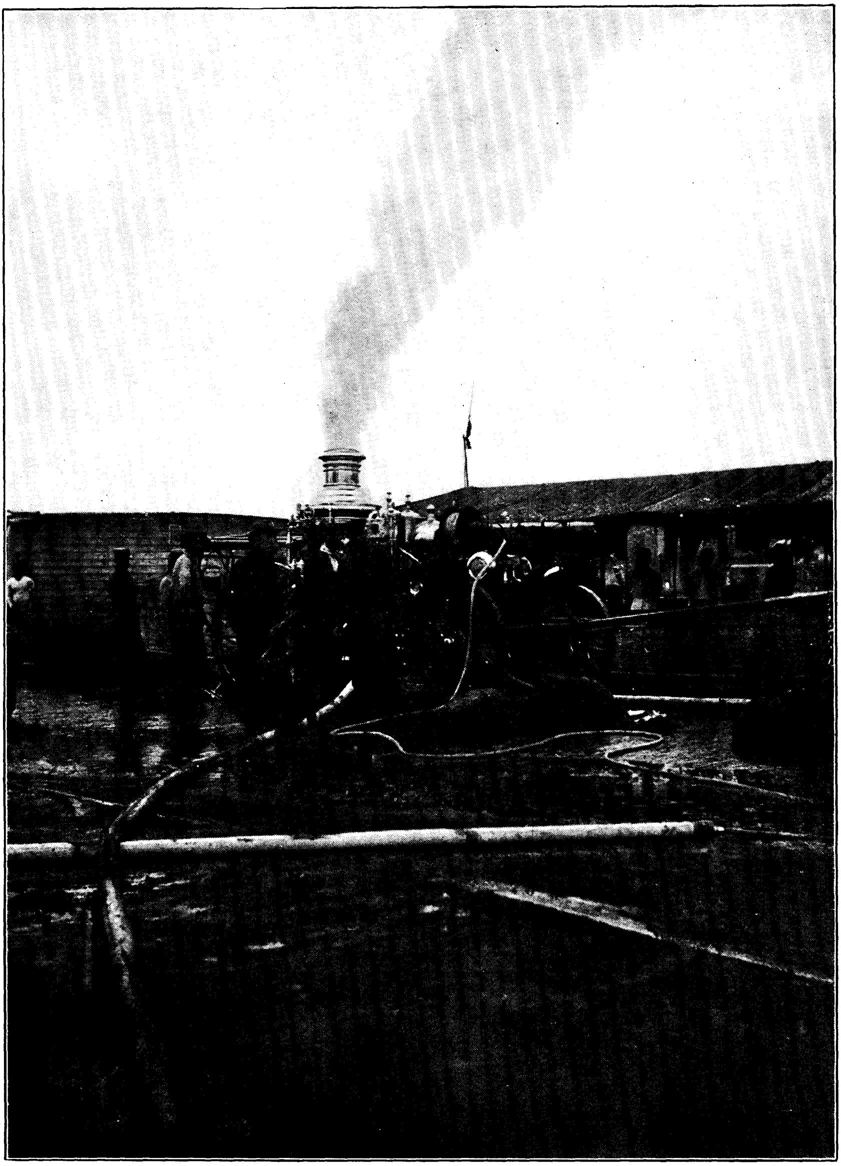
SCHOOLS.

Until July, 1902, night schools were maintained at Santa Cruz, Intramuros, and Paco stations for the instruction of the native firemen, but after the passing of act No. 430 of the United States Philippine Commission, which provided that a teacher could not be employed by the educational department in a school where there were less than 25 pupils, these schools were done away with. However, it is the inten-

ENGINE COMPANY NO. 4, INTRAMUROS—ENGINE, HOSE CART, AND SUPPLY CART.



PORTABLE STEAM ENGINE TURNED OVER BY THE SPANISH GOVERNMENT.



NEW METROPOLITAN ENGINE UNDER TEST.

tion to reorganize these schools as soon as possible, or at least give the native members some instruction in the English language. Out of the 51 native members of the department many can talk English and nearly all of them have some knowledge of the language.

FIRE BOAT.

At the present time there is no fire boat connected with the department, although the necessity for one is great. The shipping in the river, bay, and esteros can only be properly protected in this way, and a boat should be purchased as soon as possible. The number of warehouses and buildings of all kinds, either on the river or esteros, is very large, and there is an immense amount of property endangered in case of fire on the water front. A boat which could be used both in the esteros as well as the river and bay would be of great assistance to the engines in many parts of the city, and would increase the efficiency of the department very much.

The condition of the fire department to-day is a credit to Chief Hugh Bonner and his assistants, and represents a large amount of work and energy in bringing it up to its present status. The equipment and quarters as turned over to the new organization were those that the Spaniards used for many years, and were extremely crude for a city of this size. Improvements have gone on rapidly and a complete reorganization has taken place, bringing the department up to the standard of those in cities in the United States. When the alarm system and the new stations now under way are completed, the department will be by far the finest in the East, and will stand well with those of the best cities in the United States.

Attached hereto are illustrations showing old and new apparatus.

Record of fires.

No. of fire.	Date.	Hour.		Location.		Style of building.	How occupied.	Occupant.	Origin of fire.	Damage (U. S. currency).	Insurance.
		A. M.	P. M.	Street.	District.						
	1901.										
1	Aug. 9		7.50	85 Arzobispo	Intram		Residence	Sr. Arzobispo	Electric wires		
2	Aug. 13	12.45		134 San Marcelino	Paco	2 story, stone	do		Unknown	$12.50	
3	Sept. 16		7.25	Alcalá and Dulumbayan.	Santa Cruz		Drug store		Lamp explosion		
4	Sept. 17	1.45		Outside city limits							
5	Sept. 28		6.20	42 San Roque	Santa Cruz	2 story, stone and wood.	Photograph gallery.		Lamp explosion	25.00	
6	Oct. 15		7.05	322 Herren	Paco	do	Schoolhouse		do	5.00	
7	Nov. 2		6.15	81 Marina	Ermita	2 story, wood	Residence	Thos. Harper	Overturned lamp	1,000.00	
8	Nov. 2		6.15	83 Marina	do	do	do	— Erler	do	250.00	
9	Nov. 11	7.08		Escolta	Binondo	2 story, stone and wood.	Paris restaurant	Chas. Jenkins	Defectivestovepipe.	150.00	
10	Nov. 11		2.45	191-195 Calderon	do	do	Dry-goods store	Iremis Felix	Electric wires	40.00	
11	Nov. 11		8.43	89 Ilang Ilang	San Nicolas.	do	Bakery	Ting Krocie	Defective flue		
12	Nov. 18		6.53	122 Santa Rosa	Quiapo	do	Residence	A. Francisco	Careless use of mat.		
13	Nov. 19	2.50		131 Escolta	Binondo	do	Hotel and restaurant.	Weingarten & Goldstein.	Defective flue	100.00	
14	Nov. 19	3.00		Faura and San Antonia.	Ermita				False alarm		
15	Nov. 23	12.12		Camba and Lara	San Nicolas.	2 story, stone and wood.	Store	Sy Ongco	Overturned lamp		
16	Dec. 7		9.40	284 Enrile	Santa Cruz	1 story, stone	Carpenter shop	Wells & Milne	Lighted cigar		
17	Dec. 19		10.16	Novaliches	San Miguel				False alarm		
18	Dec. 31		8.20	Peña Francia	Paco				do		
	1902.										
19	Jan. 1		3.12	Maestranza	Intram	1 story, stone	Arsenal	U. S. Government	Spontaneous combustion.	100.00	
20	Jan. 4		6.35	San Jacinto	Binondo	2 story, stone	Saloon	— Shute	Overturned lamp	100.00	
21	Jan. 8	9.50		Arroceros	Ermita	1 story, wood and iron.	Commissary warehouse.	U. S. Government	Unknown	500.00	
22	Jan. 17	2.25		Soler and Azcarraga.	Tondo	3 story, brick	Stores and lodgings.	Various	do	17,000.00	
23	Jan. 21		9.10	Outside city limits							
24	Feb. 4		3.50	do							
25	Feb. 11		9.03	Ylaya and Azcarraga.	Tondo	Canvas tent	Exhibition tent		Spark from magic lantern.	20.00	
26	Feb. 13	10.55		Bang-Bang	Paco	1½ story, wood and stone.	Residence	V. Geyer	Unknown		
27	Feb. 16	1.16		Concepcion and Marquez.	do	35 nipa shacks	Residences	Various	do	500.00	
28	Feb. 23	10.59		18 Salcedo	Santa Cruz	1 story, wood and stone.	Residence	C. Guzman	Spontaneous combustion.		

29	Mar. 4		8.25	Sanchez	Tondo	2 story, wood and stone.	do	Felix Guz	Carelessness	12.00	
30	Mar. 8		10.00	104-108 Nueva	Binondo	do	Gambling house	Chinese	Unknown	75.00	
31	Mar. 10		4.52	155 Solana	Intram	do	Residence	Various	Cinders from fireplace.	25.00	
32	Mar. 28	5.00		Barrio Farola	San Nicolas	125 nipa shacks	Residences	do	Condemned by board of health.	2,500.00	
33	Mar. 28	9.45		179 Marquez de Comillas.	Paco	4 nipa shacks	Residences and store.	Various	Unknown	440.00	
34	Mar. 29	9.18		Rotondo	Sampaloc	1 nipa shack	Residence	do	do	5.00	
35	Mar. 29		4.42	280 Jolo	Binondo	2-story, stone and wood.	do	do	Defective flue	10.00	
36	Apr. 1			Nozaleda	Paco	18 nipa shacks	Residences	do	Condemned by board of health.	600.00	
37	Apr. 2		7.30	Hospital	Intram	1-story, stone	Storehouse	United States Government.	Lamp explosion	10.00	
38	Apr. 3			Near S. Lazaro Hospital.	Trozo	6 nipa shacks	Residences	Various	Condemned by board of health.	300.00	
39	Apr. 4			Nozaleda	Paco	14 nipa shacks	do	do	do	500.00	
40	Apr. 5			do	do	5 nipa shacks	do	do	do	200.00	
41	Apr. 7			Marquez de Comillas	do	1 nipa shack	Residence	do	do	25.00	
42	Apr. 21		9.10	Rosario	Binondo	Electric-light pole			Fuse in transmitter burned.		
43	Apr. 22			Near Exposition Building.	Paco	1 nipa shack	Residence	Various	Condemned by board of health.	10.00	
44	Apr. 30			Baygumbayan	do	2 nipa shacks	Residences	do	do	15.00	
45	Apr. 30			Nozaleda and Faura	do	1 nipa shack	Residence	do	do	10.00	
46	May 28		4.28	Muelle de Reina	S. Nicolas	2-story, stone and wood.	Custom-house	United States Government.	Spontaneous combustion.	500.00	
47	June 19	8.30		Ayuntamiento building.	Intram	3-story, stone	Palace	Insular government.	Electric wires	3.00	
48	July 4	1.10		Arlequi and D. de Alba.	Quiapo	1-story, concrete and iron.	Warehouse	Pacific Oriental Trading Cos.	Unknown	255,000.00	$187,000.00
49	July 7	2.50		286-302 Paseo Azcarraga.	Tondo	2-story, wood and brick.	Stores and lodgings.	Chinese and Natives	do	210.00	Unknown.
50	July 13		8.55	Arranque	Sta. Cruz				False alarm		
51	Aug. 2		9.10	Pl. del Carmen and Romero Aquino.	Quiapo	1-story, iron	Acetylene gas house.	Crispolo Liagos	Careless use of material.	10.0	None.
52	Aug. 6	7.30		48 San Luis	Ermita	2-story, wood and brick.	Residence	Capt. H. R. Stiler	Defective flue	None.	None.
53	Aug. 13		6.00	91 Escolta	Binondo	2-story, brick and stone.	English hotel	James E. Cole	Lamp explosion	None.	8,800.00
54	Aug. 20		11.15	Near S. Lazaro Hospital.	Sta. Cruz				Outside city limits		
55	Aug. 25		8.25	138 Anloague	Binondo	2-story, brick and stone.	Storehouse	Ling Ching	Lamp explosion	1,340.00	5,500.00
56	Aug. 27	Ver	bal.	38 Gastambide	Sampaloc	2-story, wood and stone.	Residence	A. Downing	do	13.00	17,000.00
57	Sept. 8		12.50	45 San Jacinto	Binondo	3-story, brick and stone.	Spanish hotel	Luciano Fernandez	Defective flue	100.00	1,100.00
58	Sept. 9	10.05		83 Escolta	do	2-story, brick and stone.	German pharmacy.	Boie & Schadenberg	Explosion of rectifier.	430.00	128,000.00

Record of fires—Continued.

No. of fire.	Date.	Hour.		Location.		Style of building.	How occupied.	Occupant.	Origin of fire.	Damage (U.S. currency).	Insurance.
		A. M.	P. M.	Street.	District.						
	1901.										
59	Sept. 11	....	7.04	17 Plaza del Conde ..	S. Nicolas...	2-story, wood and stone.	Cigar factory	Yu Suas	Lighted cigar.......	None.	$32,000.00
60	Sept. 12	....	6.00	Escolta	Binondo....	.....do	Post-office	United States Government.	Lighted match	None.	34,000.00
61	Sept. 14	....	9.04	227 Magallanes	Intram	2-story, wood	Residence	Jacinto Gel.........	Native fireplace	None.	6,000.00
62	Sept. 17	....	10.15	66 San José	Binondo....	2-story, wood and brick.	.....do	Cooley & McWilliams.	Lamp explosion	$2.00	None.
63	Sept. 18	4.00	....	Alix	Sampaloc...	F. & P. A. pole...	....	....	Electric wire	None.	None.
64	Sept. 20	....	8.50	158 Palacio	Intram	2-story, brick and stone.	Store	American Hardware and Plow Co.	Unknown	320.00	19,000.00
				Total	....	....	....	....	....	282,458.50	438,400.00

DEPARTMENT OF ASSESSMENTS AND COLLECTIONS.

Pursuant to the provisions of sections 46 and 64, inclusive, of act No. 183 of the United States Philippine Commission, the department of assessments and collections was organized by Mr. C. H. Sleeper, city assessor and collector; Mr. Henry Steere, chief deputy assessor; and Mr. Ellis Cromwell, chief deputy collector, on August 7, 1901. The department thus created consisted of the former offices of the local collector of internal revenue and of the department of licenses and municipal revenue of the city of Manila, with such addenda as were provided by the municipal charter, embracing the appraisement, assessment, and collection of all real estate taxes on land, improvements, and leaseholds thereon within the boundaries of the city of Manila, and the imposition and collection of the cedula or registration tax, all authorized licenses, rents of city lands, markets, and other property owned by the city; to receive all fines, forfeitures, fees, and costs imposed by the municipal courts, fees collected by the sheriff or justices of the peace of Manila, and the collection of all taxes due under law or order, imposing internal-revenue taxes within the city of Manila, with the exception of the urbana and frontage taxes, abolished August 7, 1901, in accordance with the provisions of section 47 of act No. 183; also forestry taxes received from the products cut or taken from the public lands of the provinces outside of Manila.

The clerical forces of the assimilated departments were retained. The personnel, consolidated and revised, consisted of 1 city assessor and collector, 1 chief deputy assessor, 1 chief deputy collector, 1 appraiser, and 108 clerks, superintendents, bookkeepers, inspectors, market collectors, and laborers, aggregating a quarterly pay roll of $12,647, consisting of 24 American and 84 native clerks and employees, at an average monthly compensation of $39 United States currency.

APPRAISEMENT, ASSESSMENT, AND COLLECTION OF REAL-ESTATE TAXES.

The real-estate tax being a new departure from the old established system of taxation in vogue throughout the Archipelago in the past, its introduction, assessment, and collection necessarily met with numerous impediments and unforeseen obstacles, occasioned primarily through ignorance of the law on the part of the majority of the land and property owners, and by the delay in obtaining the necessary printed instructions, forms, and other adjuncts required. For the foregoing reasons it was deemed expedient to extend the time in which declarations were required to be filed with the city assessor and collector, as set forth in section 46 of act No. 183, from September 1 to September 16, 1901. (See act No. 214, U. S. P. C.)

In the preparation and execution of this work the portion of the regular clerical force assigned to this division was found to be entirely inadequate. Authority was therefore applied for and obtained to employ an emergency force of 24 Americans and 50 natives at an average monthly stipend of $47.70 each, to be used as draftsmen, clerks, inspectors, appraisers, and measurers. This additional force entered immediately upon its respective duties, the inspectors, measurers, and appraisers verifying the declarations as submitted by the property owners with the property to which each pertained—that is, in such instances where the description furnished was sufficient to enable the location of the property. Here another obstacle was encountered in that fully one-third of the declarations and descriptions furnished by property holders did not agree with the actual property owned; and in numerous instances property declared could not be located at all. This, therefore, made an entire and complete canvass of the city essential for the proper assessment of the taxable realty within its limits.

In the preparation of the tax rolls, registers, and the checking of the declarations and plans, additional clerical assistance was required. To this end the emergency force was increased by the employment of 22 Americans and 2 natives. This combined force of emergency men was gradually reduced until on June 30 there remained only 17 Americans and 44 natives. This additional temporary assistance, however, made it possible to work the entire city by blocks or districts, the declarations as presented by the owners, agents, or administrators being distributed to the respective field parties working therein. In this manner a complete canvass of the city was effected. In instances where the plans furnished with the declarations failed to agree with the measurements taken, new plans were prepared by the inspectors and turned over to the draftsmen for comparison with the skeleton block prepared by the office force. This double check furnished the means of rectifying numerous errors committed by owners in the preparation of their original plans and declarations.

APPRAISING VALUES OF LANDS, IMPROVEMENTS, AND LEASEHOLDS.

Owing to the variations in values submitted by different owners, and in order to establish uniformity, the appraised value was calculated by comparison with the amount of some recent sale in close proximity to the property to be appraised, by the amount at which held for sale, and by inquiries to notaries, real-estate men, land owners, and, in fact, from any source from which the desired information could be obtained.

The usual method employed in appraising the value of land was, after judicious inquiry and comparison, to arrive at a conservative estimate of the value per square meter of the land on a certain street; this value to govern in that particular vicinity. On improved property the superficial area was computed at 80 per cent and on unimproved property at 70 per cent of the estimated value, and the lineal frontage at double the rate of the estimated value per square meter. The results of these two give the appraised value of the inside lots.

On corner lots the higher street rate to govern, and frontage on both streets added. However, occasionally the mean of the two rates would be applied to the area and the frontage added. If on three or four streets, the mean of the rates would be applied with all frontage added.

Interior property, with few exceptions, depending entirely upon the location and condition, was computed at one-half of the street rates, with no frontage.

In very deep lots a depth of from 20 to 40 meters was computed at street rates; the balance at the interior rate.

Information obtained by examination of the records of the city registrar was found to be valueless, so far as the fixing of the present land values and securing descriptions were concerned. It was therefore abandoned on September 21 and the foregoing method employed.

The plan adopted in appraising improvements was to ascertain the probable cost of the building when erected, its present rental value, the number of store and living rooms, and, by a comparison with other buildings in the vicinity, the amount of rental it should earn.

On account of the inaccuracies of the official map furnished the department and the faulty declarations submitted, property owners were requested to furnish exact plans of their properties, in order to secure correct assessment. This request was readily complied with and the work of assessment made much easier.

By virtue of act No. 341 of the United States Philippine Commission, enacted January 29, 1902, the district of Santa Ana and the barrio of Gagalangin were attached to the municipality of Manila. The real estate thus taken into the city of Manila will be assessed and the tax rolls prepared for the collection of the taxes by October 1, 1902.

Under date of March 1, 1902, the city assessor and collector submitted a certificate to the effect that the listing and valuing of all real estate situated within the city limits had been completed. Notices to this effect were published, as provided by section 52 of the Manila charter, for the period of ten days, in two newspapers, one English and one Spanish, of general circulation. In accordance with these notices, 568 protests were filed with the city assessor and collector, covering 1,207 pieces of property, of which the assessed value was reduced upon 758, sustained upon 420, and increased on 29. Of this number 82 of the protestors appealed to the board of tax appeals under provisions of section 53 of the Manila charter. These appeals covered 335 pieces of property, of which the board made the following disposition, viz: Thirty-nine were reduced from the assessed value placed by the city assessor and collector, 292 were sustained, and 4 were increased. The total reductions of these assessed values made by the board of tax appeals was $288,135.68; the total increase of assessed valuation, $16,628.94; leaving the net amount of reduction at $271,506.74.

On August 1, 1902, the city assessor and collector advertised, as stated above, to the effect that real estate situated within the territory annexed to the city of Manila, by act No. 341 would be completed and ready for examination on August 15. In answer to this notice 10 protests were received, valuation was reduced upon 3, sustained upon 23, and the valuation changed upon 1 by assessing part of the valuation against the leaseholder. Four appeals, covering five pieces of property, were made to the board of tax appeals, of which two were reduced from the valuation of the city assessor and collector and three were sustained. The total reduction by the board of tax appeals was $456.22.

ASSESSED VALUATION FOR TAX PURPOSES OF THE CITY OF MANILA.

The tax rolls as hereinbefore described exhibit the assessed value of the taxable real estate and improvements as follows:

Assessed value of land	$25,296,062.18
Assessed value of improvements	15,709,128.42
Total assessed value of taxable property	41,005,190.60

Of which $248,248.55 was assessed against 23 leaseholds.

The number of owners represented in the above amounts were: 716 owners of unimproved property; 4,160 owners of improved property, and 13,210 owners of houses; making the total number of persons liable to this tax 18,086.

The number of pieces of land assessed against unknown owners was 26. The land was valued at $42,599.85. The number of houses assessed against unknown owners was 115, valued at $2,935; total property assessed against unknown owners amounted to $45,534.85.

In addition to the taxable property within the limits of the city the records of the assessment division show the following property exempt by law from taxation under the provisions of the municipal code:

Land belonging to the city of Manila	$1,344,806.72	
Improvements belonging to the city of Manila	475,180.00	
		$1,819,986.72
Land belonging to the insular government	7,668,594.56	
Improvements belonging to the insular government	1,444,250.00	
		9,112,844.56
Land belonging to the military government	1,654,557.32	
Improvements belonging to the military government	797,000.00	
		2,451,557.32
Land and improvements belonging to religious orders		3,526,663.24
Land and improvements belonging to the archbishop of the Catholic Church		2,737,423.90
Land belonging to various other sects and orders	$5,692,160.80	
Improvements belonging to various other sects and orders	161,693.00	
		5,853,853.80
Total amount of property exempt from this form of taxation		25,502,329.54

Further information relative to property exempt from taxation in the municipality of Manila is shown in exhibit marked "Exhibit B."

COLLECTION OF REAL ESTATE TAX.

The collection of land taxes was commenced on May 1, 1902. Every precaution was taken in advance and provisions were made to handle the anticipated rush of taxpayers. Although notices apprising the public that taxes were due and payable on or before May 31 were published in three daily newspapers, one English, one Spanish, and one Tagalog, and additional notices were placed in the public markets, post-office, the city hall, and other conspicuous places throughout the city, comparatively few payments were received until the expiration of about one-half the time allowed.

Although payments came in very rapidly from about May 15, it was deemed advisable to request an extension of the time within which payments could be made without suffering the penalty, from May 31 to June 30, which request was granted in act No. 409 of the United States Philippine Commission. This extension gave ample time to allow taxpayers the meditation and deliberation necessary.

During the period of five months consumed in the collection of these taxes for the year 1901 and 1902, 29,816 receipts were passed through the cashier's division to the taxpayers, amounting to $688,267.34.

On credits of urbana and frontage taxes previously paid for the year 1901 (section 47, Manila charter), the amount of $69,818.57 was allowed as follows: Urbana, $48,972.12; frontage, $20,846.45.

Total amount of cash collected, $624,186.11. It should be stated, however, that one-half of the taxes for 1902 may be paid on or before December 31 without suffering the penalty.

The delinquents for the fiscal year 1901 numbered 4,482 on September 30, 1902, the total amount of the delinquent tax being $26,278.66; and for 1902, 8,109 delinquents, amounting to $140,106.85. It is believed that at least one-third of the delinquent taxes for 1901 will have to be dropped from the tax rolls as uncollectable.

INDUSTRIAL TAX.

The amount of industrial tax collections shows a decrease as against the collections for the same period of last year, although there has been a decided increase in business and a large number of industries have been established during this period.

There are at present in force 12,407 patentes. Issued during this period, 6,373 patentes. Number of bajas (canceled patentes) during this period, 2,559.

A loss of $21,164.56 was sustained in these collections during the third and fourth quarters of the fiscal year on account of the depreciation of local currency in which this tax is assessed and collected.

There has been collected during this period industrial tax amounting to $251,594.12½, United States currency, as against $310,971.10 for the same period of last year.

Most of the large industries that have been organized during the past year are joint stock companies, issuing and selling stock, and the industrial tax of such companies is assessed on the amount of dividends declared, being 5 per cent of such dividends. Little or no revenue has accrued from these companies, as very few, if any, have declared dividends; and it is believed that only a few of them will declare dividends during the coming year, but will carry their profits forward as a reserve fund, which is allowable under the industrial regulations. It is also thought that several of the large stock companies doing business in these islands are carrying an unusually large reserve fund on account of the fact that the industrial tax will probably be abolished at an early date.

One of the largest of these stock companies, the Compañia General de Tabacos de Filipinas, has not as yet paid for the year 1901, as they have claims for certain refunds which have not been settled as yet. This alone reduces the collections by about $15,000, United States currency.

A large number of delinquents are employees against whom salary tax has been assessed and who have failed to pay. Considerable trouble has been experienced in collecting this tax against salaries.

A large number of bajas (canceled patentes) are caused by the different industries canceling their old patentes and taking out new ones as their business increased. Also, a great many stores selling food stuffs have been closed by the board of health during the months of April, May, and June, on account of unsanitary conditions.

STAMP SALES.

The amount of stamp sales for the period covered by this report is $84,803.62½, as against $100,649.24 for the same period of last year, which shows a decrease of $15,845.61½. The reason for the decrease is that all stamps used on custom-house papers were formerly sold by this department, but on February 6 of this year the customs service began selling all stamps used on their papers. This alone reduced the amount of stamp sales about $1,000 United States currency per month; and the depreciation of local currency, in which the stamp tax is assessed and collected, further reduced the stamp sales for the third and fourth quarters of the fiscal year 1902 and the first quarter of the fiscal year 1903 by $6,339.28.

CERTIFICATES OF REGISTRATION.

The certificates of registration, or cedula tax, for the year 1901, which was authorized by section 60 of act No. 183 of the United States Philippine Commission, and section 63 of act No. 133 of the United States Philippine Commission, was collected during the months of September, October, and November of 1901. There were issued 67,366 certificates. The tax for the year 1902 was collected during the months of May, June, July, August, and September of 1902. There were issued 43,341 certificates, of which 3,500 were issued free to persons paying more than one peso as industrial or real estate taxes, authorized by section 34 of act No. 133 of the United States Philippine Commission.

A great many persons who secured certificates in October, November, and December, 1901, were under the impression that the certificates were good for one year from date of issue. Hence the small number of certificates issued for the present year.

There has been collected during the period covered by this report, as cedula tax, $58,891.24, as against $20,713.40 for the same period of last year.

The collections for the period covered by this report have sustained a loss of $3,392.83 on account of the depreciation of local currency during the third and fourth quarters of the fiscal year 1902 and the first quarter of the fiscal year 1903. This tax is assessed and collected in local currency. The large increase in the amount collected, as against the same period of last year, is accounted for by the fact that the cedula tax was raised from 20 cents local currency to $1 local currency, and that the tax for the two years 1901 and 1902 has been collected during this period.

MATADERO OR SLAUGHTERHOUSE TAX.

This is a tax or fee for slaughtering animals in the public slaughterhouse. The fee is 3 cents local currency per kilogram of dressed meat.

A city ordinance requires that all animals slaughtered for food purposes must be slaughtered in the public slaughterhouse.

During the period covered by this report there have been slaughtered 21,961 head of cattle, and 69,322 hogs, on which was collected the sum of $73,841.49½ United States currency, as against $52,543.62 United States currency for the same period of last year.

The collections were materially decreased during the months of April and May on account of the quarantine regulations governing the sale of fresh meat. Also a loss of $5,800.12 United States currency was sustained in these collections during the third and fourth quarters of the fiscal year 1902 and the first quarter of the fiscal year 1903, on account of the depreciation of local currency, in which this tax is assessed and collected.

The large increase in collections for this period as against those of last year is due to the fact that more animals have been slaughtered and that a stricter compliance with the above-mentioned ordinance has been required. A number of arrests and convictions have been secured by the police department for the violation of this ordinance.

PUBLIC MARKETS.

There are at present six public markets in the city, located as follows: Divisoria, in the district of Tondo; Quinta, in the district of Quiapo; Arranque, in the district of Santa Cruz; Sampaloc, in the district of Sampaloc; Herran in the district of Malate, and Santa Ana, in the district of Santa Ana.

The market tax is also collected at the railway station and at all bay, river, and estero landings, from persons making sales at such places, but not on consignments of goods or produce.

The amount of market tax collected during this period is $127,334.02 United States currency, as against $101,756.27 United States currency, for the same period of last year.

A loss of $9,132.47½ United States currency on the market collections for this period and the first quarter of the fiscal year 1903 was caused by the depreciation of local currency, in which this tax is assessed. A further loss during the months of April, May, and June was caused by the quarantine regulations, which prohibited the sale of almost all kinds of fruits and vegetables in the markets.

The introduction of a ticket system during the month of October, 1901, caused a large increase in the collections, and the opening of two new markets, Divisoria and Quinta, in lieu of the two old markets (Divisoria and Arroceros, discontinued), has further increased the collections.

LICENSES.

All licenses other than those imposed under the provisions of act No. 59 of the United States Philippine Commission, commonly known as the Manila liquor license act, are collected in accordance with the provisions of ordinance No. 9, provost marshal-general, with the amendments enacted by the municipal board.

During the period covered by this report 10,178 applications for licenses were received, of which 205 were disapproved, 143 uncalled for, and 9,629 granted. This is an increase over the number of licenses approved and granted for a like period of the preceding fiscal year of 2,382 licenses.

Licenses were issued under the Manila liquor license act as follows:

First-class bar licenses	150
Second-class bar licenses	110
First-class restaurant liquor licenses	57
Second-class restaurant liquor licenses	48
First-class hotel liquor licenses	14

Second-class hotel liquor licenses	8
First-class wholesale liquor licenses	61
First-class wholesale liquor licenses, quarterly	2
First-class wholesale liquor licenses, semiannual	3
Second-class wholesale liquor licenses	3
Third-class wholesale liquor licenses	5
Distillers' licenses	8
Theater licenses	3
Druggists' licenses	2
Brewers' licenses	1
Grocery liquor licenses	85
Native wine licenses	1,430
Total number liquor licenses issued during this period	1,990

TRANSFERRED.

Grocery liquor license	1
First-class bar licenses	19
Second-class bar licenses	30
First-class restaurant liquor licenses	8
Second-class restaurant liquor licenses	9
First-class hotel liquor licenses	1
Second-class hotel liquor licenses	1
First-class wholesale, annual	4
Total of transfers effected during this period	73

Aggregating a revenue of $3,795 local currency.

There were surrendered, taken up, and revoked during this period 31 liquor licenses.

Licenses in effect prior to August 7, 1901, 898.

GENERAL LICENSES ISSUED UNDER PROVISIONS OF ORDINANCE NO. 9.

Business licenses issued	6,345
Entertainment licenses issued	2,599
Peddlers' licenses issued (quarterly)	8,434

There were surrendered, taken up, or revoked, 323 licenses of the above class.

VEHICLE LICENSES.

The number of public vehicles licensed in the city during the period covered by this report was 3,021, the revenue derived from this source amounting to $7,440.10.

Dog licenses issued	346
Licenses for carts	929
Licenses for bicycles	560

LIVE STOCK REGISTRATION.

There is a fee or tax of 20 cents local currency charged for the registration of live stock, and a fee of 10 cents local currency charged for transferring the ownership of an animal.

The amount collected under this head for the period covered by this report is $627.33, as against $1,214.05 for the same period of last year.

The large decrease in the amount collected, as against the same period of last year, is accounted for by the fact that when an animal is once registered there is no further fee or tax unless a transfer of ownership is made.

Number of animals registered during this period, 4,040.

Number of animals transferred during this period, 3,922.

The registration rules were probably very rigidly enforced during the fiscal year 1901, as comparatively few animals have been registered during the period covered by this report.

VEHICLE TAXES.

Vehicle taxes are a continuation of a Spanish impost requiring that each vehicle not used for official purposes, by religious orders, or foreign consuls be taxed a certain amount annually according to the following scale: Carromatas, caratellas, and caratons, $6 local currency per annum; quilezes and calesas, $9 local currency per annum; four-wheeled vehicles, $12 local currency per annum; this tax being payable quarterly in advance.

The records of this division show that at the present time there are 7,550 vehicles of various descriptions satisfying this tax.

The revenue from this source for the period covered by this report was $23,787.65½ United States currency, as against $27,843.33 United States currency for the same period of last year.

A loss of $1,930.31½ United States currency has been sustained on the collections for this period on account of the depreciation of local currency in which this tax is assessed and collected.

VEHICLE EQUIPMENT.

Vehicle equipments, consisting of staff, disk, number plate, and driver's chapa, are furnished by this department in accordance with the provisions of section 7 of municipal ordinance No. 9, at a cost to the purchaser of $0.75 United States currency for each complete outfit. Duplicates are furnished upon application at cost price.

During the period covered by this report there have been furnished 2,050 complete outfits, netting a revenue of $1,537.50, and of duplicates of various parts which had been lost and refurnished by this department the sum of $148.82 United States currency, making the total amount received from this source $1,686.32 United States currency.

MUNICIPAL COURT COSTS, FINES, AND FEES, SHERIFF'S FEES, JUSTICE OF THE PEACE COURT COSTS, FINES, AND FEES, CITY ATTORNEY'S FEES, AND POUND RECEIPTS.

These costs, fines, fees, and receipts, except pound receipts, are accepted and receipted for under authority contained in section 61 of the Manila charter. Pound receipts are accepted under section 9 of ordinance No. 31 of the municipal board.

The amounts received from the above-mentioned sources during this period are:

Municipal court fines and fees	$88,373.29
Justice of peace court fines and fees	2,043.73½
Sheriff's fees	2,907.19
City attorney's fees	104.49
Pound receipts	301.02
Total	93,729.72½

FRONTAGE TAX.

This is a Spanish tax, originally assessed against owners of all property fronting on streets, for the purpose of securing funds for lighting and cleaning streets.

Section 47 of the Manila charter abolishes this tax, to take effect June 30, 1900, but provides for the collection of all delinquent frontage taxes, and further provides that "all persons who have paid for the year 1901 any frontage tax on real estate shall receive a credit for the same on the real estate tax levied for the year 1901."

Reference to the real estate collections will show that, under the provisions of this section, credit has been allowed on account of frontage paid for 1901 and 1902, amounting to $20,846.45, United States currency. There has been collected as delinquent frontage tax during this period the sum of $21,592.36½, United States currency. The tax was assessed and collected in local currency.

RENTS.

Under this head there is collected rent of all city property used for private purposes. During the period covered by this report rent has been collected from 125 persons and firms occupying city property, netting a sum of $3,483.80, as against $1,957.04 for the same period of last year. Of this number, 116 have no lease or contract, 3 have leases with the municipal board, and 1 has a lease given by the Spanish Government.

The records show that on September 30 the monthly rental of city property amounted to $278.11, United States currency.

Rent for city property in many cases is inadequate. Regular leases are being made from time to time by the municipal board, and in most cases the property is being rented to the highest bidder after being advertised. City property rented on this plan brings an average rental of 10 per cent of its assessed value.

With the exception of one or two cases, rent is collected in local currency, the depreciation of which has caused a loss of $303.52½, United States currency, in this collection during the third and fourth quarters of the fiscal year 1902 and the first quarter of the fiscal year 1903.

CERTIFICATES OF INSTALLATION.

This is a fee charged for the inspection of the installation of electric wires by the city electrician and is authorized by ordinance No. 15 of the municipal board, enacted January 11, 1902, since which date there has been collected $1,405.48, United States currency.

MISCELLANEOUS COLLECTIONS.

Under this head the following collections have been made during the period covered by this report:

August 12, for obstruction of the public way	$7.50
September 18, 7 per cent of the gross subscriptions of the Manila Telephone Company for April, May, and June, as per contract with Spanish Government	2,255.83
November 12, sale of condemned stationery	30.05
November 21, 7 per cent of the gross subscriptions of the Manila Telephone Company for the months of July, August, and September, as per contract with the Spanish Government	383.52½
January 23, unexpended balance of application fund received from the chief of the department of licenses and municipal revenue	70.95
February 21, received from the treasurer of Santa Ana as municipal collections due the city of Manila	90.24
March 1, amount received for privilege of operating line of small boats from Santa Ana to San Felipe	8.59
March 22, 7 per cent of the gross subscriptions of the Manila Telephone Company for the months of October, November, and December, as per contract with the Spanish Government	279.79
April 1, amount received for privilege of operating line of small boats from Santa Ana to San Felipe	8.38
April 22, received for sale of furniture and effects found in the court of first instance, for which no claimant appeared	186.37
May 2, amount received for privilege of operating line of small boats from Santa Ana to San Felipe	7.92
May 23, payment for parcel of land situated on Calle Jaboneros, district of San Nicolas, sold by the municipal board	1,500.00
June 3, amount received for privilege of operating line of small boats from Santa Ana to San Felipe	9.69
July 2, amount received for privilege of operating line of small boats from Santa Ana to San Felipe	8.81
July 2, 7 per cent of the gross subscriptions of the Manila Telephone Company, for the months of January, February, and March, as per contract with Spanish Government	336.21
August 2, amount received for privilege of operating line of small boats from Santa Ana to San Felipe	8.09
September 2, amount received for privilege of operating line of small boats from Santa Ana to San Felipe	7.66
Total miscellaneous collections	5,199.58½

AZCARRAGA IMPROVEMENT FUND.

Under this head was collected on May 10 the sum of $489.95 for a piece of city land sold by resolution of the municipal board under date of May 3, which resolution provided that this amount should be credited to the Azcarraga improvement fund, for the purpose of improving the street of that name.

TOTAL COLLECTIONS.

The total amount of collections for the period covered by this report is $1,562,325.12, as against $865,712.10 for the same period of last year.

CURRENT EXPENSES.

The expenses of the department since its organization have been unusually large on account of the extraordinary emergency force required in the preparation of the records of the assessment division. The pay roll of this force during a portion of this period has exceeded that of the regular roll, this item alone amounting to $39,333.10 for the period. However, for the ensuing year, by the reorganization of the personnel of the office and by supplanting the emergency clerks by a regular force of classified men, the above amount will be reduced by at least one-half.

REGULAR SUPPLIES.

The funds expended under this head included the purchase of stationery, office furniture and fixtures, books, registers, tax rolls, forms, surveyors' transits, draftsmen's instruments, tracing cloth, equipments for public vehicles, etc., and for the period amounted to $12,952.66½.

As all the permanent fixtures and instruments required have been purchased, the expenditure under this head for the year 1903 should not exceed $8,000.

Incidental expenses consisted of expenditures made for cooly hire, advertising taxes due and delinquent, repairs to office furniture, fixtures, and typewriters, and for the period amounted to $461.68. For the coming year the expenditures under this head should not exceed $300, exclusive of the advertising and costs incidental to the sales of personal and real property to satisfy delinquent land taxes. Owing to the uncertainty of the number of such delinquents against whom this procedure will be necessary, it is impossible to estimate the amount of funds that will be required for this purpose.

TRANSPORTATION.

The amount ($586.38) expended under this head during the past ten months was occasioned by the inability of the department designated by law to furnish all official transportation required. The above amount represents about one-fourth of the actual amount of personal funds expended by the officers and employees of this department in the performance of their official duties.

Tax refunds consist of amounts refunded to taxpayers upon erroneous or overpayment. Only one item of this nature was treated during the past year, amounting to $8.

The amount of $16 expended under the head of "Miscellaneous" was in payment of telephone rental for the office during the first four months of its existence.

The amount disbursed on account of salaries and wages of the regular authorized force of officers and employees during the period from August 7, 1901, to September 30, 1902, was $63,267.63 United States currency, thus making the total expense of this department during this period $116,625.45½, which represents 7.46 per cent of the collections; and for the ensuing year it is estimated that such expenses will not exceed, at most, 4½ per cent of the collections.

PERSONNEL.

On November 23, 1901, Mr. Charles H. Sleeper resigned as city assessor and collector to accept appointment as member of the municipal board. Mr. Amasa S. Crossfield was appointed city assessor and collector on November 24, 1901, and resigned to accept the appointment of judge of the court of customs appeals on May 17, 1902, on which date Mr. Henry Steere, chief deputy assessor, was made acting city assessor and collector. On June 19, 1902, Mr. Ellis Cromwell, chief deputy collector, was appointed city assessor and collector.

During the period covered by this report, 21 employees of the classified service have been discharged, 23 have resigned, leave of absence with permission to visit the United States has been granted to 2 employees, 1 clerk, class 6, consuming 39 days, and 1 clerk, class 7, consuming 19 days of the fiscal year 1902. In addition to these, earned leaves of absence have been granted 2 clerks, class 8, for 55 days; 1 clerk, class

9, 33 days; 1 clerk, class C, 20 days; 5 clerks, class I, 85 days; 4 clerks, class J, 29 days; 12 clerks, class K, 27 days; aggregating 307 days' leave of absence, amounting to $783.07, enjoyed by a force of 107 officers and employees during the period covered by this report.

All sums of money mentioned refer to money of the United States unless otherwise specifically stated.

RECEIPTS AND DISBURSEMENTS.

Exhibit C shows a detailed statement of receipts and disbursements of the department in United States currency. In order to make a comprehensive statement it was necessary to reduce the local currency to money of the United States, and this has been done at the current rate of exchange on the date of collection.

During this period the city has suffered a loss of $53,555.25, caused by the depreciation of local currency, in which most of the taxes are stated.

On account of the constant fluctuation of silver and, in consequence, the necessary variation in the ratio between the local and United States currency, it would seem advisable to state all taxes in United States currency in order to establish a stable rate, and in order that the revenue of the city shall not fluctuate with the price of silver. All other values in the city, such as rents, price of land, and, in fact, everything where a valuation is placed, has risen to meet the depreciation in local currency, and the loss in most cases has been covered that way. It seems only just that the government should not be loser, but should so regulate its taxes to cover this loss by stating them in money of the United States.

EXHIBIT B.

Statement of exempt property in the city of Manila for the year 1901.

District.	City of Manila.		Insular.		Military.		Church, etc.		Various.		Remarks.
	Land.	Improvements.	Land.	Improvements.	Land.	Improvements.	Religious orders.	Church.	Land.	Improvements.	
Binondo	$254,614.88	$16,500.00						$280,182.00			
Ermita	421,529.38	3,500.00	$131,425.20	$310,000.00		$225,000.00	$153,623.83	59,276.93	$2,007,762.80		Land around Paseo, Aguados. Title disputed.
Intramuros	167,560.14	257,500.00	5,001,832.43	312,750.00	$1,231,623.18	350,000.00	2,693,818.40	1,007,212.05	52,189.55 3,627,295.50	$136,500.00	Moats and land covered by walls. Title disputed. Charitable institutions, etc.
Malate	28,857.34	9,500.00			137,029.20	142,000.00		106,751.12			
Paco	78,146.08	2,500.00			14,844.36	10,000.00	40,113.00	5,358.29			
Pandacan								17,586.63			
Quiapo	86,517.45	63,000.00					639,108.01	136,973.07			
San Nicolas	202,694.60	74,500.00	1,132,953.04	271,500.00	213,156.10	20,000.00					
San Miguel			168,354.24	200,000.00				515,747.44			
Sampaloc	1,058.20		2,535.65					94,073.60		93.00	M. E. Church.
Santa Cruz	38,262.40	21,000.00	1,231,494.00	350,000.00				337,843.34	4,913.01	25,000.00	
Santa Ana		150.00						53,383.17		100.00	
Tondo	65,566.25	27,030.00			57,904.48	50,000.00		123,036.26			
Total	1,344,806.72	475,180.00	7,668,594.56	1,444,250.00	1,654,557.32	797,000.00	3,526,663.24	**2,737,423.90**	5,692,160.86	161,693.00	

RECAPITULATION.

	Land.	Improvements.	Total.
City of Manila	$1,344,806.72	$475,180.00	$1,819,986.72
Insular government	7,668,594.56	1,444,250.00	9,112,844.56
Military government	1,654,557.32	797,000.00	2,451,557.32
Religious orders			3,526,663.24
Church			2,737,423.90
Various	5,692,160.80	161,693.00	5,853,853.80
Total	16,360,119.40	2,878,123.00	25,502,329.54

I certify that the above abstract is correct.

EDW. CROMWELL, *City Assessor and Collector.*

COLLECTIONS.

[Amounts stated in United States currency.]

Source of revenue.	First quarter fiscal year 1902.				Second quarter fiscal year 1902.				Third quarter fiscal year 1902.			
	July.	August 7-31.	September.	Total quarter.	October.	November.	December.	Total quarter.	January.	February.	March.	Total quarter.
Land tax	....	....	....	....	....	....	....	....	....	....	....	....
Industrial tax	....	$2,088.24	$6,862.24	$8,950.48	$47,139.24	$4,240.96	$2,483.28½	$53,863.48½	$52,680.65	$7,780.86	$14,080.11	$74,541.62
Stamp sales	....	3,507.35½	5,216.42½	8,723.78	5,988.82½	7,170.80	7,179.68	20,339.30½	7,570.59	5,809.73	8,041.96	21,422.28
Certificates of registration	....	7,447.70	13,190.00	20,637.70	8,982.00	3,041.00	1,511.00	13,534.00	1,212.82	685.69	790.90	2,689.41
Matadero tax	....	3,707.74	4,325.91	8,033.65	5,718.24½	5,960.61½	5,745.06½	17,423.92½	5,500.30	5,529.51	5,612.93	16,642.74
Market tax	....	7,084.61	9,087.00	16,171.61	9,910.63	10,852.91	11,419.92	32,183.46	10,459.01	9,732.33	10,239.77	30,431.11
Licenses	....	3,676.75	12,934.65	16,611.40	11,391.87½	4,749.22½	40,671.57½	56,812.67½	17,941.77	5,334.26	16,339.16	39,615.19
Live-stock registration	....	35.00	64.45	99.45	65.05	49.40	47.70	162.15	67.83	55.08	50.07	172.98
Vehicle tax	....	966.51	286.75	1,253.26	4,771.25	750.00	334.62½	5,855.87½	4,900.26	765.46	432.66	6,098.38
Vehicle equipment	....	....	278.15	278.15	210.35	187.80	159.30	557.45	174.55	104.85	81.35	360.75
Municipal court fines and fees	....	3,094.97½	5,100.08	8,195.05½	6,272.73	21,664.37½	5,824.68	33,761.78½	3,827.34	14,912.47	6,923.84	25,663.65
Justice of peace court fines and fees	....	....	94.91½	94.91½	123.37½	264.66	188.05	576.08½	229.47½	186.29	146.34	562.10½
Sheriff's fees	....	....	6.00	6.00	49.63	114.13½	278.84	442.60½	292.92½	366.86	360.50	1,020.28½
Frontage tax	....	3,604.06	7,652.56½	11,256.62½	6,745.15½	1,969.29½	842.41½	9,556.86½	295.54½	150.87	328.40	774.81½
Rents	....	....	....	....	....	518,28½	268.93	787.21½	380.67½	447.68	253.27	1,081.62½
Certificates of installation	....	....	....	....	....	....	....	....	18.50	83.00	197.50	299.00
Miscellaneous	....	7.50	2,255.83	2,263.33	....	413.57½	....	413.57½	70.95	90.24	288.36	449.55
City attorney's fees	....	....	....	....	....	....	....	....	....	....	4.38	4.38
Ascarraga improvement fund	....	....	....	....	....	....	....	....	....	....	....	....
Registration of cocheros	....	....	....	....	....	....	....	....	....	....	....	....
Pound receipts	....	....	....	....	....	....	....	....	....	....	....	....
Total	....	35,220.44	67,354.96½	102,575.40½	107.368.35½	61,947.03½	76,955.06½	246,270.45½	105,623.19	52,035.18	64,171.50	221,829.87

COLLECTIONS.

[Amounts stated in United States currency.]

Source of revenue.	Fourth quarter fiscal year 1902.				Total, fiscal year 1902.	First quarter fiscal year 1903.				Total Aug. 7, 1901, to Sept. 30, 1902.	Estimated collections fiscal year 1902–1903.
	April.	May.	June.	Total quarter.		July.	August.	September.	Total quarter.		
Land tax		$218,736.93	$87,094.33	$305,831.26	$305,831.26	$43,257.20	$259,053.58	$16,044.07	$318,354.85	$624,186.11	$950,000.00
Industrial tax	$50,094.14	9,366.09	2,708.52	62,168.75	199,524.33½	47,089.05	3,786.22	1,194.54	52,069.81	251,594.14½	250,000.00
Stamp sales	6,074.75	6,595.03	5,354.89	18,024.67	68,510.03½	5,565.11	5,035.59	5,692.93	16,293.63	84,803.66½	80,000.00
Certificates of registration	1,729.53	2,999.56	9,410.14	14,139.23	51,000.34	3,632.88	3,408.92	849.10	7,890.90	58,891.24	22,000.00
Matadero tax	4,624.51	5,040.07	5,313.46	14,978.04	57,078.35½	5,520.07	5,227.15	6,015.92	16,763.14	73,841.49½	60,000.00
Market tax	7,301.60	7,396.31	8,623.70	23,321.61	102,107.79	7,558.80	8,295.48	9,371.95	25,226.23	127,334.02	113,000.00
Licenses	11,315.46	4,941.18	23,908.63	40,165.27	153,204.53½	16,491.74	7,514.76	12,377.20	36,383.70	189,588.23½	160,000.00
Live stock registration	36.46	28.39	25.72	90.57	525.15	38.65	28.85	34.68	102.18	627.33	1,000.00
Vehicle tax	4,385.86	669.50	328.61	5,383.97	18,591.48½	4,431.31	315.75	449.11	5,196.17	23,787.65½	20,000.00
Vehicle equipment	83.88	87.85	66.00	237.73	1,434.08	106.15	85.21	60.88	252.24	1,686.32	1,500.00
Municipal court fines and fees	2,956.05	3,058.10	4,587.43	10,601.58	78,222.07	3,741.01	2,880.93	3,529.28	10,151.22	88,373.29	50,000.00
Justice of peace court fines and fees	136.20	155.37	142.27	433.84	1,666.94½	113.63	128.05	135.11	376.79	2,043.73½	2,500.00
Sheriff's fees	260.38	248.10	238.27	746.75	2,215.64	222.13	217.97	251.45	691.55	2,907.19	4,000.00
Frontage tax	4.06			4.06	21,592.36½					21,592.36½	
Rents	344.86	156.79	285.72	787.37	2,656.21	342.67	295.23	189.69	827.59	3,483.80	10,000.00
Certificates of installation	221.00	201.50	230.00	652.50	951.50	186.50	132.00	135.48	453.98	1,405.48	1,500.00
Miscellaneous	194.75	1,507.92	9.69	1,712.36	4,838.81½	345.02	8.09	7.66	360.77	5,199.58½	5,000.00
City attorney's fees		12.96	7.49	20.45	24.83	6.38		73.28	79.66	104.49	200.00
Ascarraga improvement fund		489.95		489.95	489.95					489.95	
Registration of cocheros						6.50		77.50	84.00	84.00	
Pound receipts		170.90		170.90	170.90	54.83	65.29	10.00	130.12	301.02	1,500.00
Total	89,763.49	261,862.50	148,334.87	499,960.86	1,070,636.59	138,709.63	296,479.07	56,499.83	491,688.53	1,562,325.12	1,732,200.00

DISBURSEMENTS.

[Balance, $44,191.86.]

Disposition of fund received.	First quarter fiscal year 1902.				Second quarter fiscal year 1902.				Third quarter fiscal year 1902.			
	July.	August 7-31.	September.	Total quarter.	October.	November.	December.	Total quarter.	January.	February.	March.	Total quarter.
Deposited with treasurer		$35,220.44	$67,354.96½	102,575.40½	$107,370.40½	$61,944.98½	$76,955.06½	$246,270.45½	$105,623.17	$52,035.20	$64,171.50	$221,829.87
Expense:												
Regular supplies			3,101.28½	3,101.28½	386.00	246.23	1,970.71	2,602.94	330.22	107.98	1,806.74	2,244.94
Incidental expenses			67.75	67.75	20.45	2.25	20.80	43.50	50.65	9.52	101.65	161.82
Transportation			188.28	188.28					121.70	56.25	25.23	203.18
Salary and wages		3,928.84	4,826.84	8,755.68	4,812.09	4,574.61	4,749.98	14,136.68	4,906.25	4,656.58	4,738.86	14,301.69
Tax refunds					8.00			8.00				
Miscellaneous			4.00	4.00	4.00	4.00	4.00	12.00				
Salary and wages, emergency			1,177.35	1,177.35	3,128.84	2,983.34	5,201.10	11,313.28	5,942.99	5,699.70	1,781.67	13,424.36
Total		3,928.84	9,365.50½	13,294.34½	8,359.38	7,810.43	11,946.59	28,116.40	11,351.81	10,530.03	8,454.15	30,335.99

DISBURSEMENTS.

[Balance, $44,191.86.]

Disposition of fund received.	Fourth quarter fiscal year 1902.				Total fiscal year 1902.	First quarter fiscal year 1903.				Totals, Aug. 7, 1901, to Sept. 30, 1902.	Estimated expenses for fiscal year 1902–1903.
	April.	May.	June.	Total quarter.		July.	August.	September.	First quarter.		
Deposited with treasurer	$89,763.49	$261,862.07	$148,335.30	$499,960.86	$1,024,256.54	$175,556.74	$237,690.34	$122,633.31	$535,880.39	$1.560,136.93	
Expenses:											
Regular supplies	44.84		2,676.50	2,721.34	10,670.50½	1,116.53	1,017.81	147.82	2,282.16	12,952.66½	8,000.00
Incidental expenses	7.00	5.55	97.27	109.82	382.89	30.46	40.21	8.12	78.79	461.68	300.00
Transportation	8.57	35.11	52.08	95.76	487.22	34.29	27.50	37.37	99.16	586.38	480.00
Salary and wages	4,349.22	4,796.55	4,486.73	13,632.50	50,826.55	3,880.73	4,228.73	4,331.62	12,441.08	63,267.63	59,110.00
Tax refunds					8.00					8.00	
Miscellaneous					16.00					16.00	
Salary and wages, emergency	2,372.06	2,539.01	2,483.84	7,394.91	33,309.90	2,164.82	1,962.56	1,895.82	6,023.20	39,333.10	17,500.00
Total	6,781.69	7,376.22	9,796.42	23,954.33	95,701.06½	7,226.83	7,276.81	6,420.75	20,924.39	116,625.45½	85,390.00

Balance from June 30, $46,380.06.
Lost in exchange (Mexican rate of $2.27 for $1 United States currency changed to $2.35), $8.15 United States currency.
Local currency collections for first quarter fiscal year 1903 has been reduced to United States currency for benefit of municipal board.
I certify that the above abstract is correct.

E. W. CROMWELL.

PUBLIC INSTRUCTION.

On the opening of the school year, June 17, 1901, the public schools of Manila were under the supervision of Dr. David P. Barrows, as city superintendent. Dr. Barrows resigned on October 4, 1901, and the vacancy was filled by the transfer of Mr. Mason S. Stone from the Negros division on October 25. On December 6 Mr. Eugene H. Douglass was appointed deputy superintendent. He resigned June 2, 1902, when Mr. S. P. R. Thomas was appointed to the vacancy resulting.

The local school board of the city of Manila, created by virtue of section 10, act No. 74, Philippine Commission, is composed of Dr. José Albert, president; Judge Arthur F. Odlin, Dr. Manuel Xerez-Burgos, Dr. W. S. Washburn, Chaplain W. D. McKinnon,[a] Mr. Catalino Sevilla, and Hon. Arsenio Cruz Herrera.

A detailed report of the operations of the department of city schools follows:

ATTENDANCE.

The schools of the past year opened on June 17, 1901. The enrollment was light at first, but the numbers increased so that at the end of July there was an enrollment of 5,123. Thereafter the enrollment gradually decreased so that at the end of the year, March 21, 1902, only 3,395 were registered. The schools of the present year opened July 16, 1902, with a very slight enrollment. An investigation into the causes of this showed that in most cases fear of the prevailing epidemic of cholera led the parents to keep their children out of school, while in several districts of the city the entire influence of the friars was arrayed against the public-school system. The enrollment for the present year has been: July, 2,974; August, 3,084; September, 3,059, and is divided as follows:

Boys	1,878
Girls	1,181
Total	3,059
Filipinos	2,912
Chinese	54
Americans	93
Total	3,059

The following statement shows percentage of attendance and enrollment, by months, for the past school year:

Month.	Percentage of attendance.	Enrollment.
June	77	3,498
July	80	5,123
August	65	5,046
September	81	3,805
October	81	4,000
November	82	3,941
December	78	3,604
January	82	3,393
February	71	3,640
March	83	3,395

TEACHERS.

There were employed 197 teachers, as follows:

Filipino	146
American	48
Chinese	2
Spanish	1
Total	197

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[a] Deceased.

The teachers were distributed as follows:

American principals	3
Filipino principals	35
Chinese principals	1
Teachers in high school	2
Teachers in grammar schools	9
Teachers in primary schools	144
Drawing teachers	2
Teachers in leper hospital	1
Total	197

SUPERVISION AND ADMINISTRATION.

The office force of the department comprises 7 persons, as follows: One superintendent of city schools, 1 deputy superintendent, 1 clerk class 7, 2 clerks class 9, 1 clerk class "G," 1 messenger; total, 7.

NIGHT SCHOOLS.

The night schools were opened on June 3, 1901, with a personnel as follows:

Principals	6
Teachers	47
Clerks	0
Total	53

Enrollment, no figures available.

On March 21, 1902, the close of the last school year, the figures were these:

Principals	11
Teachers	98
Clerks	11
Total	120
Enrollment	1,583

On June 16, 1902, when the present school year opened, these were the figures:

Principals	14
Teachers	85
Clerks	11
Total	110
Enrollment	1,392

SCHOOLHOUSES.

The department is heavily handicapped by having to depend almost entirely on rented dwelling houses for its quarters. Most of them are entirely unsuited to school work. The city schools at present occupy 31 buildings, divided as follows:

Owned by city	6
Rented	25
Total	31

Of these 31 buildings, 4, located at Calle San Pedro 41, Calle Crespo (Tribunal Building), Calle Novaliches 58, and in Gagalanging, are in such bad sanitary condition and are so totally unsuited to school work that they should be abandoned at the first opportunity. The buildings at Calle Madrid 177, Calle Jan José 160 and 149, Calle San Marcelino 45 (interior), Calle Sagunto 316, and Calle Lemery 525 are so defective in arrangement as to be a handicap to the schools held in them. The only building which is really suited to school work is the Escuela Municipal, Calle Victoria 172.

Summarized, these figures appear thus:

Very bad	4
Poor	6
Fairly useful	20
Suitable	1
Total	31

It should be noted in regard to the schoolhouses that only one, the Escuela Municipal, is provided with anything resembling a playground, and whether this be a corollary of that condition or not, that it is the only one where any school spirit is manifest. (For a complete list of the location of schools see Appendix, Exhibit A.)

EXPENSES.

Owing to the fact that under the organization of the civil government the expenses of the city schools are met from the funds of several distinct bureaus and departments it is impossible to give accurate figures for the cost of maintaining the department.

The following statement shows disbursement of moneys under control of this office:

July 1 to August 6, inclusive		$15,017.94
August 7 to June 30, inclusive:		
Office force	$3,700.50	
Native teachers	38,866.25	
Night schools	22,120.88	
Office supplies, etc	2,450.38	
Contingent fund	1,473.34	
Transportation	171.98	
Total under civil government (United States currency)		$68,783.33
Total for the year (United States currency)		83,801.27
July 1 to September 30, 1902, inclusive:		
Salaries and wages	$26,563.63	
Contingent expenses	676.30	
Printing	538.20	
Total for the quarter (local currency)		27,778.13

It must be remembered that these figures do not cover the cost of text-books and school stationery, which are issued on requisition by the department of public instruction, and the rent, maintenance, care, and lighting of the school buildings, which are under the care of the superintendent of buildings and illuminations. The monthly rent roll, as furnished by the department making payment of same, amounts to $853.50 United States currency, and $520 local currency. Because of the circumstances cited it is impracticable to state the average cost of instruction per pupil. A rough but fairly approximate estimate, however, would place the annual expenditure for the day schools alone at $100,000 United States currency. Taking the enrollment at 3,000, which is under the actual figure, the average cost per pupil would be $33.33. When all the difficulties to be encountered here are considered, together with the great distance from the base of supplies, this compares not unfavorably with the average cost per pupil of the only schools in American territory which occupy a like position, those of the District of Columbia. The average cost of instruction for the pupils there, including supervision, for the fiscal year 1901 was $23.91.

COURSE OF STUDY.

Up to the present time it has not been feasible to establish a uniform course of study for the city schools. It was only in January of 1902 that English was made the basis of all instruction. Before this step was taken the question was submitted to the Asociación del Magisterio Filipino for its opinion, which was that the time had arrived when this very radical change could be safely made. Of course the native teachers differed widely in their mastery of English, and it was therefore impossible to prescribe any course of study which would meet the requirements and abilities of all the pupils and teachers.

It was thus necessary to spend the last school year in training the Filipino teachers in English and methods of instruction, while the work of the pupils was mostly the acquirement of English. By the beginning of the current year our teachers had advanced sufficiently to make a change possible, and at the present time the emphasis is laid rather on the teaching of subject-matter than on English purely, as such, or on methods of presentation. Of course the two latter still receive consideration, but as subsidiary to the matter taught.

The instruction in the primary schools consists in the ordinary subjects—reading, writing, arithmetic, geography, spelling, grammar, and nature study. It is a great pleasure to be able to state that there are now many native teachers who are fully able to give most intelligent instruction in these subjects.

GRAMMAR SCHOOLS.

Not only did the teachers advance very rapidly in their mastery of English during the last school year, but many of the pupils made such progress that at the beginning of the current year it became necessary to offer them a more advanced class of instruction than they had yet received. For this reason two grammar schools were opened on June 16, 1902, in Tondo and Sampaloc. These schools are distinguished by the facts that only American teachers are employed, and that the pupils are expected to understand English so well that they can use American text-books without any necessity of any study of them as a problem in language. The subjects treated are advanced arithmetic, geography and grammar, commercial arithmetic, bookkeeping, physiology, reading, composition, and civil government. Seventy-nine pupils are enrolled in these schools at present, with the prospect of more eligibles in the near future.

AMERICAN GRAMMAR SCHOOL.

The constantly increasing American population of Manila led to the establishment of an American grammar school. The school is divided into the usual eight grades, and the instruction is of the sort given in the corresponding grades of schools in the United States. The number of teachers employed in this school is 3, and the number of pupils enrolled is 93.

HIGH SCHOOL.

A certain number of American children are resident in the city who are sufficiently advanced to demand a college preparatory education. For their benefit a high school is held in the Escuela municipal building. The work at present consists of the first two years. The third year's instruction will be added in June, 1903, when there will be several properly qualified candidates. At present the number of teachers employed in the school is 2 and the enrollment is 21.

INSTRUCTION IN SPECIAL BRANCHES.

Special instruction in drawing is at present offered by two native teachers, one assigned to Ermita, Malate, Paco, and Singalong, and the other to Santa Mesa and Sampaloc. Teachers for the other districts will be found shortly. The Filipino has a gift for work of this sort, and not only is the subject one of the most popular with the pupils, but some of the work done is really very creditable.

From September 1, 1901, to March 21, 1902, the instruction in singing was under the supervision of a trained American teacher. During the present year, however, this work has devolved wholly upon the individual teachers.

Strictly speaking, no kindergartens are maintained in Manila. The work done by some of the teachers with the youngest children, however, approaches very closely to the line of real kindergarten. It is producing most satisfactory results.

Spanish is taught in the American grammar and high schools.

NORMAL INSTITUTES.

Almost as soon as American teachers were established in the schools, they devoted one hour of each day to the instruction of the native teachers in the English language. While this instruction was of course of value, the fragmentary and individual way in which it was carried on robbed it of its full usefulness. To correct this fault, normal institutes were held in the vacation of 1901 and 1902. That of the last year was in session from April 7 to May 2. The enrollment, made up with few exceptions of teachers and aspirantes in the city schools, was as follows:

Men	99
Aspirantes	197
Women	74
Total	370

The instruction was wholly in English, except for two periods each day, when Señor Regino gave instruction in botany, using the Spanish language. The aim of the institute in the main was to inculcate pedagogical methods and to illustrate their application by proper methods. The school was highly successful, was greatly appreciated by the teachers, and is productive of better professional spirit and work.

On August 1, 1902, under the direction of the honorable secretary of public instruction, the entire method of training the native teachers was changed. The session of the schools in the afternoon was abandoned, and the two hours thus gained are utilized for the holding of a normal institute in the Escuela municipal building, Calle Victoria, at which every one of the native teachers is required to be present. This concentration is, as was expected, producing excellent results. The teachers are carefully graded, and are naturally progressing much more rapidly than when they were thrown together promiscuously. The close association in classroom work seems to be producing a healthy rivalry and pride in standing high, which can not fail to react favorably on the work in the public schools.

NIGHT SCHOOLS.

Under the conditions prevailing here the night schools acquire a prominence wholly out of proportion to the position they occupy in the United States. Great care has, therefore, been exercised in the selection of teachers and in the supervision of their work, in order that the energy expended may lead to the best possible results. This care seems to have been worth while, for at present there is a widespread interest in the night schools manifest among the native population of the city. No great stress is laid on the teaching of subject-matter in these schools, as the desire of the students is to gather a speaking knowledge of English as rapidly as possible. Nevertheless there has developed in every district of the city at least one advanced class which is very eager to supplement its somewhat elementary education. Altogether the night schools are doing very good work, and seem to merit a great deal of care and support.

Very respectfully,

(Signed) S. P. R. THOMAS,
Acting Superintendent of Schools, Division of Manila.

EXHIBIT F.

BENGUET ROAD.

BAGUIO, *July 15, 1902.*

The PRESIDENT OF THE UNITED STATES PHILIPPINE COMMISSION,
Manila, P. I.

SIR: I beg to submit herewith a report upon the work of construction of the Benguet road from January to June, 1902, inclusive.

There has been opened up sufficient for wagon travel an aggregate amount of about 23 miles. There is besides opened for horse trail about 6 miles, leaving an unbroken stretch of some 4 miles, and 2 miles broken but impassable, making a total of 35 miles.

The location of this work can be seen on the map submitted with this report. The map was prepared from notes taken on the preliminary survey, and numerous changes have been made in finally locating the line. The general route and direction is, however, shown approximately.

Labor.—We pay 5 cents Mexican per hour and work nine hours per day. A capitas, or native overseer, is paid 60 cents Mexican per day. Sawyers, when using our saws and four men to a saw, get 60 cents per day. When two men bring a saw and work two men to the saw, they get 1 peso per day, and file their own saws. Native carpenters get from 60 cents to $1 Mexican per day.

	Gold, per month.
American grade foremen are paid	$60
American rock men are paid	75
Blacksmiths are paid	75
Carpenters are paid	75
The head carpenter is paid	100
The assistant head carpenter is paid	90

Rock work is costing from 40 to 70 cents gold per yard; earth work, light, is costing from 8 to 10 cents gold per yard; hardpan is 16 to 20 cents gold per yard; loose rock 35 cents gold per yard; bridge work is costing $7 per running foot; timber, felling, stripping, squaring, and hauling, $30 per 1,000 feet, B. M.; masonary $4 per yard; dry wall $1.50 per yard; charcoal is made for 6 cents per bushel; cord wood is cut for $1.50 per cord; transportation from Dagupan to Camp No. 1, a distance of 30 miles, three-fourths cents gold per pound; rice costs from $2.75 to $5 Mexican a cavane at south end, and $7.50 Mexican at north end of the work. Every native is given 2¼ pounds per day in addition to his wage of 5 cents per hour.

These prices, many of them, are quite as high as we would pay in the United States for such work, and, moreover, they do not represent the full cost, as the percentage for use of tools, office expenses, and superintendence has not been figured in, the prices simply representing the actual cost of the laborer's time and such supplies as are used in the course of the work.

The native makes but a poor showing as a laborer, and I feel convinced that it requires at least five to do the work of one ordinary white laborer in America. I am borne out in this by the above figures. Everything but personal violence has been tried to procure a higher quality of labor from him, but notwithstanding the many schemes put forth but little actual result has been gained. No foreman is allowed to strike a workman under any provocation, as a fear of violence will not cause them to work faster, but leads them to desert at the first opportunity, when they not only do not return themselves, but induce others to remain away by stories of harsh treatment.

It was eventually discovered that ridicule had more effect upon the native than aught else, and so by working upon this thread to his character we were frequently able to obtain some results. If a man would be found loafing, he would be placed up upon some lone piece of rock or other prominent point and made to sit there holding in his hands a small stone. This would tend to call down upon him a sheaf of witticisms and remarks from his colaborers, who would work with an increased vim for some time. This and similar schemes have proved quite successful in keeping the men keyed up to their work, yet in spite of all that can be done they will not do an honest full day's work such as their strength is capable of.

It is necessary to have a white foreman over just so many as he can see at one time, dependent upon the class and location of the work. The instant the eye of the white man is off them, that moment they quit further work or idle away time in vacant pretense. In character they are sly and deceitful, are totally devoid of energy, and always lie in preference to telling the truth, even if there is nothing to gain. I refer now to the lowlander, the Pangasinan and Ilocano.

The Igorrote from Benguet is a vastly superior animal. We have found the Igorrote invariably trustworthy and in general a willing worker. He can be trusted off by himself without the necessity of a white foreman to watch him, and when working does not dabble and play at work waiting only for the hours to pass, but digs in with a vim and makes progress. I would be well satisfied if there could be 2,000 Igorrotes on this work and not a lowlander. I consider one Igorrote worth three Ilocanos or Pangasinans in wage value, and his everlasting cheerfulness and good nature tends much toward the furthering and progress of the work by creating easy and harmonious relations between him and the foreman.

The labor is difficult to calculate upon in this region, as one week we may have 2,000 men and proportion the American force accordingly, while the next week we may have but 300 men, obliging the discharge of some good white foremen. The following week the force is quite apt to run up to 2,000 again and we have no Americans to work them. With certain variations this is the way the force runs all the time. Sometimes it will be steady for several weeks, and when things have got to running smoothly, suddenly they all drop away, leaving us with a crippled force, and, when several weeks later all the discharged white foremen have gotten beyond call, back they come again. It is impossible to calculate ahead, and this constant changing of labor is a cause of incalculable expense and delay.

I have offered higher wages to men who would stay here for several weeks at a time, and have sent messengers out among the villages trying to engage gangs to come here and stay, but to no purpose. I believe that 100 ordinary laborers camped on the work, staying here constantly, would accomplish more in one month's time than 300 as they do now.

With 1,500 Chinamen on the works when this road was first started, it could have been completed by now. I can not bring it too strongly to your attention that, as a laborer, the Filipino is a flat, absolute failure, a man of no energy and less judgment, ignorant, sly, deceitful, and lazy, working only because he is forced to do so, caring nothing for the money he gets at the end of the week. He wearily drags through the six days of his martyrdom, and then with a greater alertness than he has exhibited for a whole week sets his face homeward and is seen no more.

The only way I can keep men on the work at all is by having a mounted messenger on the road six days out of the week, who travels through the various towns and villages, drumming up the men, waking up the presidentes, and carrying appeals from me too the governors of the provinces, who in turn send out circular letters to the heads of the towns, and by the payment to the presidentes of 2 cents Mexican per day for each man furnished.

With good labor our progress here would probably be doubled, and expense certainly much lightened.

The complete uncertainty of the labor question renders it difficult to estimate the probable completion of the work. During the last month we have been working from 400 to 900 men, when we should have 2,000 to make any progress.

Insecurity of slopes.—One of the chief difficulties to the rapid prosecution of this work has been the unstable and insecure nature of the entire country we pass over between the foot of the mountain and Loacan. Slopes here stand at angles of such excessive steepness that the slightest disturbance of their natural condition starts a slide that may not check itself until hundreds of thousands of yards of earth, broken rock, trees, etc., have come down and been removed.

It was naturally expected that slides would be constantly occuring on the upper slopes when the natural conditions had been disturbed; but the lower slopes, not being broken open or disturbed, were expected to hold.

Experience has shown, however, that, owing to the shattered, disintegrated, and unstable nature of the interiors of all these hills, the dropping of a bowlder from above will gouge out a small hole below the roadbed. This will fall away at the sides and thereby increase in size; the more the hole increases, the larger will be the chunks dropping from its edges, until soon a huge slide is formed, which, extending upward, reaches the roadbed and the slopes above, demolishing what was previously firm bed, and extending mayhap a thousand feet above.

These slides occur in the most unlikely places, and with no previous indications generally of their insecurity. In fact, I have frequently noticed throughout this region where a piece of mountain side will seem to lose its grip on the neighboring slopes and suddenly slide out, carrying great bowlders, trees, and rock, leaving a huge gash in the face of the hill, and this in places not touched by the road—in places where the outer soil has never been disturbed, and even in the dry season, when rain is not responsible for the disruption.

The whole country is unstable and will continue so until nature has leveled these slopes down to permissible angles.

Owing to this condition and the numerous slides caused as soon as the rains started, I have made numerous changes in the route from its original survey, and am keeping down close to the river instead of up on the slopes. This makes a more expensive line, as it lies largely through solid rock and requires several crossings of the Bued River; but once completed, such a line can not be torn out, and will be solid and safe for travel.

The Bued River is a stream of great power, and during the rainy season capable of rapid and enormous rises.

When the typhoon passed here about the 1st of June this river rose 40 feet in four hours, carrying away a 60-foot span truss-bridge at the north end of the Roaring Lion Canyon.

This bridge was erected with its bottom chord 32 feet above the stream, which seemed ample room for high water.

At noon of the day the bridge was taken I was standing on the bridge and the water was at its usual height—32 feet below. At 4 o'clock that afternoon the water was 8 feet over the flooring of the bridge and running at a tremendous speed. The bridge was anchored with inch-rods extending clear through the abutments and into solid rock beneath. At 4.30, however, she was torn loose from her fastenings and swept downstream, passing in under a sister bridge of same span, and eventually stranded in the flats below, where we recovered the different parts.

Rock and timber.—Owing to the increased rock work, I have ordered two steam drills from the insular purchasing agent, which we can work to good advantage during the wet season, and each drill will be worth about 100 laborers to us.

I have also considered the erection of a sawmill an economical feature, and by building a water wheel and putting to use some of the numerous water powers in this country saw all bridge timber from the pines at the north end.

I am now endeavoring to push a horse trail through to connect the two ends, but our labor has fallen off to such an extent that we have barely enough men to take care of the slides from the rains.

As soon as the rains begin, slides of greater or less extent will constantly occur, and a force of several hundred men in the rear is necessary to keep the road open.

Macadam has been placed over about 3 miles of road, and we are at present laying over the rice paddies by Caringan a bad piece of marshy ground. It will not be necessary to place macadam over a large portion of the road, owing to the rocky and gravelly nature of the bed.

Sickness.—We have been troubled much with sickness, chiefly fever and stomach troubles.

Through January, February, and March from 20 to 30 per cent of the force was in the hospital. The lower part of this canyon, where our camps have been placed, seems to be a fatal spot.

New men coming on the work strong and healthy would within two or three weeks be stricken down, while the old employees suffer continual attacks until broken down to the point where they can no longer recuperate sufficiently to work again they are forced to seek renewed health in some other clime. The constant diet of canned goods, with but little change, has also placed the stomachs of many men in such condition as to render them an easy prey to various intestinal diseases. Many men have left here to be treated in the civil hospital, or the military hospital at Dagupan. Some have become so broken in health they left for America, and others have died.

The unusual amount of sickness during the three months mentioned has caused a considerable extra expense in the feeding of men in the hospital, the sudden removal of a foreman from his gang occasioning a loss of work from the natives till his place could be supplied, and in the general disorganization caused by rushing a green and maybe incapable man into a sick man's place, because it was imperative for some one to direct his gang, and for want of a good man a poor one would frequently have to be employed temporarily.

Those men dying on the works have been accorded decent burial, and their names and addresses inclosed in a bottle and buried with them; their effects and money, when there was any, were in each case forwarded to the insular treasurer.

Cholera has broken out in our lower camps, 12 cases occurring up to the present time, 10 of which died. All necessary precautions such as we were able to take have been made. The dead bodies were buried in lime, the contacts were isolated, clothing burned, and all parts of camp thoroughly disinfected. We are, however, at this time, once again without a doctor, as the physician attached to this work was removed by order of the board of health and no other sent to replace him. I have previously protested strongly against the removal of our doctor and our constant frequent lack of medical attention. It has always occurred that when the doctor is taken away some serious case comes up. Dr. Mabee was ordered away from this camp, and some days afterwards a young man employed in the engineer corps was taken suddenly ill and died without medical attendance. It is possible the presence of a physician would have saved his life.

Dr. Winslow was removed from here, and directly after his departure a native injured in a blast was brought to the hospital and died with no physician to attend him. Dr. Graves was removed, and within three days cholera broke out, killing 3 men with maybe others to follow.

These are the fatal cases alone, and I do not speak of the unnecessary suffering of men daily wounded in accidents or struck down with mountain fever, whose pain could have been alleviated by the presence of a physician; of men who, too ill to sit up, have been carried on stretchers, transported in bull carts or rickety caramatas 40 miles to Dagupan in order to receive medical attendance.

A contracting firm in America operating a work as extensive as this and with no physician in the camp would be liable to the gravest accusations of wanton carelessness and open to innumerable damage suits. I most respectfully beg that a physician be attached to this work who shall be subject to the orders of no one but the engineer in charge of the work.

That our need is vital, I respectfully invite attention to the following list of fatalities which have occurred in the last six months, and which does not include the 20 to 30 per cent of general sickness from dengue or mountain fever, stomach troubles, and other ills:

Since January 1 there has been killed 1 native by gangrene occurring in a wound caused by a sharp bamboo; 1 native by being hit by a falling rock; 5 natives from fever and bowel trouble; 1 native by falling through a temporary bridge while carrying a load; 1 native suddenly died one night, cause unknown; 7 natives from cholera; 1 American accidentally shot through the lungs by his revolver dropping; 8 Americans from fever and stomach trouble; 1 American negro shot by negro cook in self-defense. The man who did the shooting was taken before Judge Johnson, at Lingayen, who, after hearing the evidence, discharged him, as the deed was performed purely in self-defense; 3 Americans from cholera.

The surrounding country contains many cholera cases, and the numerous quarantines are having a detrimental effect on this work by keeping out natives. We have now on the south end only about 200 workmen and 150 on the north end.

Since the disease broke out here the natives have taken away their carabaos, and our crusher plant is much handicapped by not being able to deliver crushed stone. Owing to the small force of workmen I have been obliged to dispose of a number of white men employed as mechanics or foremen, and the whole force is at a minimum.

It will not be wise to shut down entirely, however, as during the rains so much damage can be done if slides are not properly cleared and gutters kept running, that, for the protection of the road, a couple of hundred men should be working all the time, if at all possible.

Supplies.—The constant lack of supplies absolutely necessary for the prosecution of this work has hampered us, and has retarded the progress of the work greatly. We have not, until the month of June, had filled numerous items on back requisitions, some of them months old, and even at the present time there are some few back orders remaining to be filled.

Specific instances of this is in the order for 20,000 feet fuse, placed by me last November. The first fuse I received was on January 31, 10,000 feet; in March, 13,000 feet, and not until May was any considerable portion shipped, when I received about 60,000 feet. In all, up to this time, I had ordered 100,000 feet. The want of this fuse prevented us from using men at a time when we had plenty of them.

During January, February, and March there were between 2,000 and 3,000 laborers. Yards of rock were drilled, hundreds of holes stood ready to shoot, hundreds of men were on the work ready to muck the rock, and all things had to be suspended for want of fuse. Men were transferred to dirt work, building walls, sawing timber whenever they could be placed to get any good from them.

A rush order was placed with the insular purchasing agent for tools. Delay in making this shipment caused us to work the laborers with bamboo sticks in place of picks; carpenters stood ready to erect bridges; cast washers for these bridges had been ordered months before; letter after letter had been sent asking that these washers be hurried along. Finally the time came when it was necessary to erect these bridges, and models were made of wood from which the washers could be cast, and these were taken personally to the insular purchasing agent and the request made that the castings be made at once, which was promised. It was, however, weeks after this, and only after repeated telegrams, that the washers finally arrived.

American whipsaws, although ordered months ago, are still unfilled, and we must use crosscut and poor Chino and native saws in getting out timber that could be done cheaper and quicker with good American whipsaws; and numerous other instances could be cited showing where a constant lack of supplies delays our work and increases our expense.

The progress of this work has been unsatisfactory to me and its cost per unit has been higher than the price of labor should warrant; for this all the above-mentioned reasons are in part accountable.

Conditions most favorable to a rapid and economical prosecution of any work of construction are a healthy and moderate climate, an intelligent and hard-working labor, an accessible route for transportation, a well-filled base of supplies and prompt shipment of same; here lies a complete reversal of conditions; climate unhealthy and subject to violent rain storms that similar to the Panama canal work can in one night destroy thousands of dollars' worth of property, a lazy, ignorant, and generally worthless class of labor, a difficult route of transportation from Dagupan in the rainy season when all the bridges from Dagupan to Pozzorrubie go out and supplies must wait for swollen streams to subside; a base of supplies, both commissary and general supplies, so poorly fitted that a requisition can seldom be filled as required, creating for weeks or months a loss of time and money through the employment of miserable makeshifts lacking the goods requisitioned for; and in general a considerable delay in shipment of supplies.

But even with the above conditions unfulfilled, progress could be made if such labor as we have could only be induced to remain here when they come, so that camps could be established along the route, each holding a certain number of men who would be employed in working out a certain piece of territory, and becoming accustomed to their work would in a week or so probably be worth a hundred per cent more as a laborer.

The physical and topographical conditions of this part of Luzon are sufficient to cause a considerable amount of trouble, delay, and expense, but they are subordinate to the two chief requirements of this work, namely, labor and supplies.

One thousand Chinamen camped on the work at a peso a day would be worth more than all the labor Luzon could furnish if this labor were paid even no more than board.

Bridges.—There have been erected since January 1, 28 bridges from 10 to 60 foot span, including one 45-foot truss, two 60-foot trusses, and one 32-foot truss; also 10 culverts of small span. Most of these bridges include either masonry or dry wall abutments and wing walls, and are of specially selected timber of heart wood, well seasoned and neatly framed, and put together strong enough to bear a locomotive. In one stretch of about 8 miles are 66 bridges and culverts, besides a great many small box or stone drains.

In detail an approximate itemized notation of work accomplished and expense incurred follows.

The average amount of labor employed during this period and the cost was as follows:

Month.	Natives.	Americans.	Cost of natives.	Cost of Americans.
January	812	48	$4,802.10	$3,560.78
February	3,024	62	17,248.84	4,977.03
March	2,705	55	15,671.94	4,423.80
April	1,925	51	9,571.11	4,063.35
May	1,550	50	7,977.36	3,896.10
June	980	31	7,601.59	2,364.33

Supplies from the insular purchasing agent to the amount of $30,174.29 Mexican have been purchased.

Commissaries from the civil supply store amounting to $10,967.75 Mexican have been purchased. Rice for the subsistence of native employees has cost $13,439.67 Mexican currency. Transportation from Dagupan has cost $7,089.92.

Number of cubic yards rock moved	20,000
Number of cubic yards earth moved (unclassified)	100,000
Number of cubic yards cribbing built	466
Number of cubic yards masonry built	621
Number of cubic yards dry wall built	2,000
Number of feet bridges built	413
Number of feet B. M. timber cut	150,000
Number of cubic yards crushed stone laid	6,000

Since writing the above Dr. Graves has been returned to camp, and the cholera situation has become so bad it was necessary to close up the work at the south end and clear the line of natives. The north end is still working a small gang.

It is also impossible at present to move supplies from Dagupan out, owing to strict quarantines through all Pangasinan Province. I have succeeded in having our headquarters camp at Twin Peaks made a post-office. The director-general of posts has just established the office and had arranged for a twice-a-week delivery. Hence, in future, all official mail should be addressed to Twin Peaks, Benguet Province.

It would also be a matter of great convenience if a telegraph line could be established here, as at present we have no means of telegraphic communication.

Maps and photographs accompany the report. Attention is respectfully invited to my letters of June 10, to the chairman of Committee on Appropriations, as supplementary to this report, containing expression of opinion as to the probable cost of and time for completion of road and other details connected with the work.

Very respectfully,

N. M. Holmes,
Engineer, U. S. Philippine Commission.

EXHIBIT F[1]

FILIPINO AS A LABORER.

OFFICE ARMY TRANSPORT SERVICE,
Manila, P. I., November 4, 1902.

Hon. WILLIAM H. TAFT,
Governor of the Philippine Islands, Manila, P. I.
(Through military channels.)

GOVERNOR: In compliance with your request per letter dated October 14, 1902, addressed to Maj. Gen. George W. Davis, U. S. Army, commanding Division of the Philippines, and pursuant to indorsements thereon from the adjutant-general and the chief quartermaster of the division, I have the honor to submit the following report upon the Filipino as a laborer:

My experience with Filipinos employed in any capacity dates from April 1, 1901, on which date I was assigned to duty in charge of the United States army transport service, and the depot quartermaster transferred to me the employees pertaining to that office, among whom were the following: Fifty-one Filipino boatswains, or patrones, 76 Filipino engineers, 96 Filipino firemen, 6 Filipino oilers, 258 Filipino sailors.

These Filipinos were employed as crews for the various launches and lighters in the transport service at Manila and as such may be considered as skilled labor.

In addition to the foregoing there were 55 Filipino bosses, 1,260 Filipino laborers, 13 Chinese laborers.

Of these, 5 bosses and 250 laborers were employed on the quartermaster's docks and at the commissary warehouses. The remaining 50 bosses and 1,110 Filipino laborers were designated "bay laborers" (or "stevedores") and were employed on the bay in loading and discharging cargo exclusive of coal. The 13 Chinese laborers were employed in the freight-receiving room. The Filipino bosses, Filipino laborers, and Chinese laborers are considered unskilled labor.

The skilled labor was employed by the month and paid on the 15th and last day of each month at a rate fixed by the division commander, to which reference will be made later. These employees were under the charge of the master or patron of the launch or lighter to which they were assigned. When vacancies occurred other men were secured by the master or patron and were later employed by competent authority. It frequently happened that the launch masters or patrones would discharge members of their crews and secure other men to take their places. The assignments of crews to the launches and lighters were not regarded as permanent by the crews, and as a result they would exchange with crews of other launches and lighters without reference to the office.

It was understood that should launches be required for night service or on Sundays that the crews would receive double pay for the time so employed.

The stevedore or unskilled labor (Filipino bosses and laborers) was secured by employing the bosses, each of whom secured a gang of from twenty to thirty laborers. These men were employed by the day at a rate fixed by the division commander. They were paid daily through the bosses. Each boss was given a time slip stating the number of men in his gang and the time they had worked. These time slips were certified to as being correct by the superintendent of labor and were then presented to the cashier of the depot quartermaster's office by the several bosses, who received their own pay and that due the laborers of their respective gangs, whom the bosses paid.

Ten hours was considered a day's work for this class of labor, and when extra time, or night, or Sunday work was required the laborers received pay at double the rate for the time so employed, the bosses being given the time slips covering such time.

All coal pertaining to the transport service was handled under an informal contract, the rate per ton being 40 cents on the bay and 70 cents from lighters to coal piles, or from coal pile to lighter, the quartermaster's department furnishing all lighterage. The contractor employed Chinese labor for this work. This method of handling coal was adopted because it was thought Filipinos could not do this class of work, which is considered heavier and harder than the handling of cargo to and from ships and lighters. This system was continued until May 1, 1901, on which date the reorganization of the employees of the transport service was in effect so far as practicable, to which only such reference will be made in this report as involves changes in system of handling the Filipino and Chinese employees.

The organization of the launch crews was completed and each crew was assigned to a particular launch. A list of the crew in each case was prepared and entered in time books, of which there was one for each launch. Timekeepers visited the launches at irregular intervals, verifying the crew, and the crews were in this way made to understand that this assignment was permanent, and that they were employed to work on that launch and nowhere else unless specifically assigned by the officer in charge of the transport service. Each launch was given a number, and all property and tools were inventoried and stamped with the number of the launch, all in the presence of the launch master or patron, who was then required to sign a receipt for same. This property was verified monthly with the view of collecting the value of any shortage at the next payment. The Filipinos understood this and soon appreciated the necessity of looking after property for which they were responsible. All employees of the launches were required to comply with the regulations for launch service, a copy of which was furnished the master or patron of each launch and lighter.

It was explained to all crews that they were employed by the month, and would receive no pay for days on which they were absent, no extra pay for night or Sunday work, for which launches were specially designated when necessary, and were not required for service the next morning. This practice continued for about four months, at the expiration of which time all launches were required to work whenever called upon.

The system of semimonthly payments was discontinued June 30, 1901, from which date payments were made on the last day of each month on a pay roll prepared for each crew. There were no complaints made by the launch crews when these changes were made.

The number of Filipinos employed as crews of launches and lighters at Manila varies from time to time because of the constant changes in the launches at this port, due to their being assigned to stations elsewhere. The records of this office show that on June 30, 1901, there were 433, and October 31, 1902, 472 Filipinos employed as launch and lighter crews, rated as skilled labor, and which are classified as to duties and rate of pay as shown in the following table:

Occupation.	Rate per month, United States currency.	On rolls.	
		June 30, 1901.	Oct. 31, 1902.
Engineers	$50.00	2	
Do	40.00	8	7
Do	37.50	10	7
Do	35.00	6	5
Do	32.50	14	7
Do	30.00		8
Assistant engineers	50.00		3
Do	40.00	3	1
Do	30.00	4	7
Do	27.50	12	7
Do	25.00	5	5
Do	22.50	4	7
Do	20.00	1	
Oilers	20.00	2	4
Do	15.00	1	
Firemen	20.00	4	
Do	17.50	2	
Do	15.00	73	80
Boatswains	50.00	2	
Do	40.00	3	2
Do	37.50	12	4
Do	35.00	6	6
Do	32.50	4	6
Do	30.00	15	9
Do	22.50	5	2
Do	20.00	16	11
Quartermasters	12.50	41	42
Sailors	15.00	24	22
Do	10.00	195	177
Cooks	16.00		3
Waiters	7.50		1
Total skilled labor		472	433

Of the launch crews on the rolls of this office, it is found from inspection of the time books that from June 1, 1901, to October 31, 1902, 91 per cent of the patrones have been continuously in the service, 5 per cent have resigned, and 4 per cent were discharged; 89 per cent of the engineers, firemen, and oilers have been continuously in the service, 8 per cent resigned, and 3 per cent discharged; while only 11 per cent of the sailors have been continuously in the service, the remaining 89 per cent resigning after about three months.

The efficiency of the launch crews, both in the engine and dock departments, has gradually improved to such an extent that within the past two months it has been deemed for the best interests of the service to replace American and European launch masters, who have been discharged for cause, by Filipino patrones, who in all cases have performed their duties as such without accident or delay and to the entire satisfaction of this office.

All bosses and unskilled (or stevedore) labor were employed as individuals by this office. They were organized into gangs of one boss and fifteen or twenty laborers, and the gangs numbered consecutively from 1. Gangs Nos. 1 to 15, inclusive, were designated as regular gangs, and all others as emergency gangs. Each boss was furnished with a time book, bearing the number of his gang, in which was entered the names of the boss and all of the laborers. The bosses were required to keep and verify the time of their respective gangs, under the supervision of American timekeepers, stevedores, and cargadores, under whose direction they worked. These time books were turned in to the general timekeeper every evening, when the gangs were dismissed, after verification, and returned to the bosses every morning, when they were verified before going to work. They were informed that they would be employed by the day; that on May 15 the daily payments would be stopped, and in lieu thereof they would be paid on the 15th and last day of each month, to include June 30, 1901, after which date they would be paid monthly (on the last day of each month), and only for such time as is shown by the time book, and that no double pay for night or Sunday work would be allowed. They were further informed that the regular gangs would first be given employment and that such additional labor as might be required would be proportioned among the emergency laborers in such manner as to give all an equal share of the emergency work. The advantage to both the employer and employees of regular attendance, without which no permanent or organized labor could be had, was explained to all concerned, and that the men who worked the best and lost the least time would be placed in the regular gangs as vacancies occurred.

Notwithstanding some of the changes may be considered radical, they were accepted by the Filipinos without complaint or comment, and work was commenced on May 15, 1901, under the organization and system of instruction briefly outlined above, each gang under the supervision of an American stevedore, cargador, wharfinger, or checker.

This Filipino labor handled all cargo, except coal, received and shipped by this office and coaled all launches and steam lighters.

All coal, except that required for launches and steam lighters, was handled by contract at a stipulated price per ton, or by Chinese labor employed by this office at 75 cents United States currency per day, and double rate for extra time and night and Sunday work. In view of the high wages demanded by the Chinese, and the cost by contract, the employment of Filipino labor for the handling of coal was commenced July 1, 1901. Laborers were employed at Cavite for work at the coal deposits at Sangley Point, and supplied from the regular and emergency gangs employed at Manila for coal work on the bay. This labor did well from the first, and while only a small proportion of the coal work was done by Filipinos during the month of July, 1901, they handled more than one-half of the coal in October, and have practically handled all coal since December, 1901.

The quantity of coal handled each month by contractors, Chinese labor and Filipino labor, with the cost in each case, the number of Chinese and Filipinos employed by this office, the rate of pay, number of days employed, the average number of tons handled per man per day and cost per ton, are shown in the comparative statement herewith inclosed, marked "A." From this statement it will be noted that the cost per ton was less and the average per man per day greater with Filipino labor than with Chinese labor or contract.

The records of this office show the average number of Filipino stevedores employed each day, including Sundays, holidays, and fiestas, during the fiscal year ending June 30, 1902, to have been: Fifty-seven bosses, at $30 per month, amounting per day to $56.22; 906 laborers, at 50 cents per day, amounting per day to $453, or a total average daily cost for labor of $509.22.

During the same period there were transported to and from Manila.

Passengers and troops		97,106
Animals		1,609
Baggage, cabin passengers'	pieces	63,061
Estimated weight of these 63,061 pieces baggage	pounds	6,306,100
Estimated weight troop baggage and property (not manifested)	do	12,000,000
Mail, 22,011 sacks, estimated weight	do	1,540,770
Freight, 3,813,200 packages, estimated weight	do	352,119,263
Coal	do	386,691,626
Making a total of	do	758,657,759

of which 91,627,694 pounds were handled by contractors and Chinese labor and 667,030,065 pounds by the Filipino labor above referred to.

That a clear understanding may be had of the amount of work actually done by this labor during the entire fiscal year in handling this freight, attention is invited to the fact that where cargo is received it is first taken from the vessel and placed in lighters, then from the lighters to the dock, and from the dock to the various storehouses. Subsistence stores, after being placed on the dock, are separated and transferred by lighters to the various storehouses. Where coal is stored in deposits at Cavite or on the Pasig River, it is first placed in lighters and taken ashore, then carried in baskets and dumped on coal pile. Where vessels are coaled from coal deposits, coal is carried in baskets from coal piles to lighters and from lighters placed aboard the ship, then moved again into the bunkers, where it is trimmed. It will, therefore, be noted that all this freight, including baggage, coal, and forage, was handled at least three times, and that there were actually handled during the fiscal year by Filipino labor on an average of 2,741.1 tons per day, or 3.02 tons per man (laborer) per day at a cost, including the wages of the bosses and laborers, of 18⅓ cents, United States currency, per ton for labor, not including stores handled for other departments by the same labor.

To avoid the delay incident to the quarantine of vessels at this port because of Asiatic cholera, a quarantine station was established on the bay from which to load and discharge all cargo and clear all ships pertaining to this office.

On April 1, 1902, 12 Filipino bosses and 240 laborers were sent to this quarantine station for duty, where they remained until June 5, on which date the quarantine station was abandoned because of cholera among the laborers. From time to time during this period the number of laborers was increased until the average number was 350. During this time these Filipino bosses and laborers remained in quarantine, working day or night as their services were required without any increase in wages other than a Filipino ration. They were brought ashore occasionally, by authority of the quarantine officer, to procure a change of clothing. That they might be held in quarantine, each gang as it came ashore was placed in a wagon and under the charge of an American employee, sent to their homes where they received their clothing without leaving the wagon and returned to the quarantine station.

The records show that during the months of April and May, 76,276 tons of freight, exclusive of coal, were handled by an average of 350 Filipino bosses and laborers. No laborers could have worked harder or been more loyal than these Filipinos during the time referred to.

From an inspection of the time books it is found that of the 685 regular Filipino laborers employed 316 had twelve months' continuous service, 189 had eleven months' during the fiscal year, 102 had ten months' during the fiscal year, 70 had nine months' continuous service, 8 had eight months' continuous service.

The emergency labor, considering the time it was required, averaged from 90 to 95 per cent in attendance.

Attention is respectfully invited to the reports of Capt. F. A. Grant, Q. M., U. S. Army; Capt. H. W. French, Q. M., U. S. Army; Mr. Adam Neder, in charge of coal, and Mr. W. B. Moses, in charge of labor, herewith inclosed and marked, respectively, "B," "C," "D," and "E."

In conclusion, the following replies are submitted to your inquiries:

1. The number of laborers employed averaged daily 57 bosses and 906 laborers during the fiscal year ended June 30, 1902.
2. They are classified only as dock, river, and bay stevedores.
3. Each class handles baggage, freight, and coal received and shipped by this office.
4. The only skilled labor employed are patrones, engineers, oilers, firemen, and sailors. Their classification and rate of pay are fixed by the size of the launch to which they are assigned.

5. The wages are: For patrones, from $50 to $20; engineers, $50 to $32.50; assistant engineers, $40 to $20; oilers, $20 to $15; firemen, $20 to $15; sailors, $10; bosses, $30 per month; laborers, 50 cents per day.

6. All Filipino employees are paid at the end of each month for the number of days present during the month.

7. There is no difficulty in securing good labor.

8. The laborer works from 7 a. m. to 12 m., and from 1.30 p. m. to 5.30 p. m., and, under emergencies, whenever required, with no extra pay for Sunday or night work.

9. This labor is very efficient.

10. Chinese labor was formerly employed for the handling of coal but has been abandoned and replaced by Filipino labor, which, by practical tests during several months, averaged more tons per man per day and at a much lower rate per ton.

I prefer the Filipino labor employed by this office to Chinese.

11. The attendance of Filipino laborers has been and is excellent. They do not absent themselves after Sundays, holidays, or fiestas, nor during any such days should they be notified in advance that they will be required for work. Their physical strength is much improved and they are capable of doing as much and as hard work as any laborers we have had in the Orient.

Very respectfully,
(Signed) J. B. Aleshire,
Major and Quartermaster, U. S. Army, in Charge Army Transport Service.

Office Army Transport Service,
Manila, P. I., October 24, 1902.

Maj. J. B. Aleshire,
Quartermaster, U. S. Army, in Charge Army Transport Service, Manila, P. I.

Sir: I have the honor to make the following report in regard to the native labor employed by this office for handling freight of all classes consigned to and shipped by this office:

When Manila was first occupied by United States troops in August, 1898, we were informed by business men who furnished labor for loading and unloading freight of ships and handling same on shore that it was impossible to secure Filipino labor, and that Chinamen were used for that purpose, as the Filipino would not work. We found this to be practically true at that time, as it was very difficult at times to procure enough labor on account of this fact to handle Government freight, so that for nearly two years after the arrival of our troops on the island much of the troop baggage and some freight was handled by soldiers.

Subsequently Filipinos were employed and competent American stevedores placed in charge of them to teach them how to work. The result of this action has been wonderful, and to-day this office is handling freight cheaper than it was possible to handle it with Chinese labor in the early years of occupation.

In May of the present year Filipino labor unloaded one ship at Calle Principe wharf and loaded her in nine hours, at a cost of 7½ cents gold per ton.

The records of this office will show that the U. S. A. T. *Dix*, 10,500 tons measurement, was unloaded in Manila Bay and the freight stored in the lighters in ninety hours, at a cost of 12 cents gold per ton.

During the same month I was present at the United States army corral when 30 Filipino laborers unloaded from a large steel lighter and passed through one side port of the U. S. C. T. *Francisco Reyes* and stored it, 1,600 packages of freight in just one hour.

While the above records may be called exceptional cases, it will show what can be accomplished by native labor when required of it.

The labor used by this office is thoroughly organized, there being gangs of 20 men each under charge of a native boss. In discharging a ship one gang is usually placed at each hatch—the boss and three men remain on deck; the remainder go below, break out, and sling the freight ready for hoisting from the holds.

One American stevedore is in direct charge of the unloading of each ship.

The difference between this way of handling freight and the way it is handled by commercial firms is quite noticeable. One reputable firm of stevedores in this city has a native woman employed as stevedore, while other firms have no stevedore of any kind in charge of their labor; and, upon, investigation, I have found that they do not take out freight either as fast or with as little breakage as our employees do under the method outlined above.

As freight consigned to this office and carried by commercial liners is unloaded and delivered to us over ship's side by stevedoring firms, we have had an opportunity to compare the difference between native labor handled by American stevedores and that labor under charge of native stevedores or no stevedores at all.

Our men leave this dock at 6.30 a. m. daily, and at 7 a. m. are at work. They stop at 12 noon and are at work again by 1.30 p. m., quitting at 5.30 p. m. Should it be necessary to work them at night or on Sundays, they receive the same rate of pay as for regular hours. If required to work an hour or so overtime to complete the work on a ship, they do so willingly, and without extra pay, though it must be remembered that they are taken from this dock in the morning and returned to shore the same night by launch; they are not required to work an hour in a banca to go to work and another hour to return at night.

It is my experience that Filipino labor is much more satisfactory in every way than Chinese labor; it is not so expensive, and we can accomplish more in a day with natives than can be accomplished in the same time with an equal number of Chinese.

It is my opinion, as well as of our stevedores, that 15 of our native laborers will discharge or load more freight in one day than any equal number of Chinese that have ever worked for this department.

If a man should be injured while working for this department, he is sent to the hospital and cared for until he recovers. This right to hospital treatment and feeling of security as regards steady employment, together with fair treatment, seems to appeal to the men, and I have experienced less trouble in controlling them, with as good results, so far as work is concerned, as I have had with any other labor during my lifetime.

Regarding Chinamen, my experience is that while most of them work well, at the same time they are ready to take advantage of a rush of work and ask for a higher rate of wages, and, should their request not be granted at once, will leave their employment, even though they may have been a long time in your employ and have been well treated. This has been the experience of this department.

During the early days of the late cholera epidemic, and when we had a large number of transports and about 50,000 tons of freight per month to handle, in addition to troops and troops' baggage, our Filipino labor worked faithfully day and night, at times not seeing their families for weeks, and not knowing whether they were alive or dead. I am sure Chinese would have taken advantage of the occasion to demand higher wages.

Very respectfully,

F. H. GRANT,
Captain and Quartermaster, U. S. Army,
Assistant to Officer in Charge Army Transport Service.

OFFICE ARMY TRANSPORT SERVICE,
SHIPPING DEPARTMENT,
Manila, P. I., October 28, 1902.

Maj. J. B. ALESHIRE,
Quartermaster, U. S. Army, in Charge Army Transport Service,
Manila, P. I.

SIR: In compliance with your oral instructions regarding my observations as to the merits of Filipino and Chinese labor to the best interests of this department, I have the honor to submit the following report:

Of the several hundred Filipino laborers employed daily in loading and unloading the ships, those who have been longest in employ work more rapidly and handle cargo more carefully than the emergency crews employed for two or three days when more than the usual number of ships' cargoes are to be handled. But even these emergency men work better the last than the first days. They display a desire for permanent employment. There is never any difficulty in procuring all the labor required.

The Filipino seems ready and willing to learn the improved methods of performing labor and displays considerable ingenuity in handling heavy packages. It has often been observed when an unusually bulky or awkward package is to be handled they advance ideas to each other as to the way of procedure. An American overseer, though not able to speak their language, will show them by signs a simple way. They immediately adopt it and do not have to be instructed a second time.

During the recent epidemic of cholera, when ships have been held in quarantine from three to five days, it has often been necessary to work overtime and occasionally all night. This the Filipino has cheerfully done.

There is but little so-called skilled Filipino labor in this department, confined chiefly to the engineers on the launches. They take good care of the machinery and seem to understand the principles of its construction to such an extent that minor "breakdowns" in the machinery are often repaired with crude tools in a rapid and ingenious manner.

The crews of all launches pertaining to this department are Filipinos under American launch masters, except some of the smaller ones, which have Filipino masters who have a sufficient knowledge of the English language to carry out instructions given in English. So far as navigating is concerned, it is believed the Filipino is capable to master them, but from lack of knowledge on the part of Americans of the native dialects, it is necessary at present, and will be for some time to come, to have many American masters, but they may gradually be replaced by Filipinos who have learned sufficient English to carry out orders without first having them translated. Most commercial launches are entirely manned by Filipinos, because the commercial companies well established have been here sufficient time for their representatives in the supervision of this class of labor to have acquired a knowledge of Spanish or native dialects. This has not been practicable for Americans, as their energies, especially the military, have been needed in other ways than the acquirement of foreign languages; but it must be said in justice to them that unusual advancement has been made in this direction by our American overseers, and the Filipino also deserves credit for the strides he has made in the acquirement of our own language.

But few Chinese are employed in this department, from which comparison may be drawn. These are employed, moreover, in loading and unloading small packages from the wagons at the storeroom. All the heavy work is performed by Filipinos. If new methods of handling cargo are presented to the Chinese, they sullenly accept it for the time being and immediately revert to their own methods. They are great consumers of opium, which seems to be as necessary to them as tobacco to the Filipino, but the effects produced leaves them stupid and weak; they object to working overtime without large compensation; they do not display a desire to acquire a knowledge of any other language, making it difficult to give them instructions. There seems to exist a national hatred between the Chinese and Filipinos. The average Filipino will not work under Chinese bosses, or acquire their methods, but seem anxious to learn from Americans.

I have never known of fights occurring between American and Filipinos or American and Chinese labor, but between the Chinese and Filipinos they are frequent, utilizing anything convenient as weapons. The altercations starting between two individuals often result in ten or a dozen of each class becoming engaged before police or American overseers can separate them. All this expended energy and time would be saved were they never put to work side by side.

It is earnestly hoped the Filipino labor of this department may not be supplemented by Chinese. Should it ever have under its control shops, dry docks, or marine railroads, it is believed better satisfaction would be obtained from the Filipino apprenticed under carefully selected American foremen than by Chinese. The Filipino under the Chinaman will only bring discord, indifferent results, and no improvement to the Filipino's natural ingenuity and desire to improve.

In closing it might be stated that the Filipinos permanently employed in this department have not changed in their shifts more than would be expected from American labor of the same class for over a year, and the percentage of attendance of permanent laborers is constantly increasing. Formerly it was difficult to get regular attendance on "feast days," but that has almost if not quite entirely disappeared. They seem satisfied to enjoy the regular holidays observed by Americans.

Respectfully submitted.

H. W. French,
Captain of Infantry, Quartermaster, U. S. Army,
Assistant to the Officer in Charge Army Transport Service.

Manila, P. I., *October 23, 1902.*

Maj. J. B. Aleshire, *Quartermaster, U. S. Army,*
In charge Army Transport Service.

Sir: I have the honor to inform you in reference to Chinese and Filipino labor. I have worked Chinese in Cavite coal yard, loading and unloading coal.

I find that in handling them they will not work unless every hour or so they are allowed to stop for rest to smoke about fifteen minutes, and they want from 12 to 2 p. m. for lunch hour.

The number of tons they unload per man do not exceed from 1¾ to 2 tons, and at $1.50 Mexican per day they are more expensive than Filipino labor.

They will not work nights or Sundays unless double pay is given them.

The employment of Filipino labor at 50 cents gold per day and only one hour for dinner, and who will work nights and Sundays if necessary at same rate of wages, and load as much or more coal per day.

When I worked Filipino labor in Cavite yard at 50 cents gold per day they averaged 2 tons per man, and sometimes from 2¾ to 3 tons, according to distance. Chinese never averaged over 1¾ to 2½ tons per man per day.

As for bay loading, I find the Filipino average for loading and trimming is 1¾ tons per man for the past three months.

My opinion is that the Filipino labor is the cheapest and the best.

Very respectfully,

ADAM NEDER.

OFFICE ARMY TRANSPORT SERVICE,
Manila, P. I., October 21, 1902.

Maj. J. B. ALESHIRE, *Q. M., U. S. Army,*
In charge Army Transport Service, Manila, P. I.

SIR: I have the honor to make the following statement relative to the employment of native labor by this department and under my supervision. I wish to state that I have at all times found the native laborers regular in attending to their duties.

There is employed by this department from 500 to 1,000 native laborers, and I have found that fully 95 per cent of these men worked every day that there was work for them to perform, and when laid off for lack of work were always ready and willing to return to their duties when this department needed their services.

I further state that my experience with labor has proved to me that in many ways the native laborers are superior to Chinese laborers, providing the natives are handled in a proper manner.

The majority of the native laborers employed by this department at the present time under my supervision have been so employed for the past year, and I have never had any trouble in getting these men to work Sundays, holidays, and late at night when it has been necessary for work to be done.

Very respectfully,

W. B. MOSES,
In charge native labor and river stevedores,
Under direction of Maj. J. B. Aleshire, Q. M., U. S. Army.

Statement of coal handled by contracts, Chinese labor, and Filipino laborers, July 1, 1901, to June 30, 1902, army transport service, Manila, P. I.

[Rate and cost in United States currency.]

	By contract.			By Chinese labor.										By Filipino labor.									
	Pounds.	Rate per ton.	Total cost.	Day work (average).			Night work (average).			Cost.	Pounds.	Cost per ton.	Average per man per day in tons.	Bosses (average).			Laborers (average).			Cost.	Pounds.	Cost per ton.	Average tons per man per day.
				Men.	Day.	Rate.	Men.	Day.	Rate.					Men.	Day.	Rate.	Men.	Day.	Rate.				
																							Tons.Lbs.
July, 1901	16,213,200	$0.70	$5,066.69	....	....	.....	.....	.....	.....	....	....	......	....	2	5	$1.00	71	5	$0.50	$187.50	1,012,286	0.4150	1 988
August, 1901	22,077,441	.58	5,516.48	98	4	$0.75	43	4	$1.50	$552.00	978,880	$1.26	0.81	4	12	1.00	100	12	.50	648.50	3,031,895	.4787	1 289
September, 1901	2,720,413	.69	838.30	151	7	.75	55	7	1.50	1,370.25	4,592,000	.66¾	1.$\frac{944}{2240}$	4	41	1.00	68	41	.50	1,558.00	14,421,811	.2425	2 691
October, 1901	5,967,360	.64	1,704.96	48	4	.75	100	4	1.50	588.00	2,665,600	.49½	2.$\frac{58}{2240}$	8	24	1.00	165	24	.50	2,172.00	21,710,875	.2250	2 1,004
November, 1901	7,250,240	.56	1,815.06	....	....	.....	.....	.....	.....	....	....	......	....	10	20	1.00	153	20	.50	1,730.00	14,309,029	.2708	1 2,150
December, 1901	9,094,400	.49	1,989.40	....	....	.....	.....	.....	.....	....	....	......	....	14	29	1.00	298	29	.50	4,727.60	39,040,901	.2712	1 2,060
January, 1902	....	......	....	....	....	.....	.....	.....	.....	....	....	......	....	14	26	1.00	285	26	.50	4,069.00	28,063,936	.3239	1 1,366
February, 1902	4,928,000	.51	1,122.00	....	....	.....	.....	.....	.....	....	....	......	....	15	27	1.00	229	27	.50	3,496.50	27,919,132	.2806	1 1,971
March, 1902	10,402,560	.41	1,904.04	....	....	.....	.....	.....	.....	....	....	......	....	12	28	1.00	385	28	.50	5,726.00	33,942,482	.3778	1 806
April, 1902	4,737,600	.41	867.15	....	....	.....	.....	.....	.....	....	....	......	....	10	24	1.00	290	24	.50	3,720.00	32,130,432	.2593	1 2,217
May, 1902	....	......	....	....	....	.....	.....	.....	.....	....	....	......	....	10	21	1.00	265	21	.50	2,992.50	32,090,996	.2088	2 1,075
June, 1902	....	......	....	....	....	.....	.....	.....	.....	....	....	......	....	8	25	1.00	160	25	.50	2,200.00	21,729,344	.2314	2 739

EXHIBIT F^2.

PHILIPPINE LABOR.

OFFICE LAND TRANSPORTATION AND GOVERNMENT CORRALS,
Manila, P. I., October 24, 1902.

His Excellency WILLIAM H. TAFT,
Civil Governor of the Philippines, Manila, P. I.
(Through office of the chief quartermaster of the Division.)

GOVERNOR: In compliance with your letter to Maj. Gen. George W. Davis, U. S. Army, requesting certain information from me regarding Filipino labor, I have the honor to state:

That during the month of September, 1902, an average month in the matter of labor in this department, I employed 941 Filipino laborers.

That of the labor regularly employed the percentage of time lost shows only 3½ per cent, or an attendance of 96½ per cent. Whereas all labor was formerly paid by the day and week, it is now paid monthly.

That I am able to secure all the labor I need at 40 cents and 50 cents United States currency per day.

This labor is classified into the following classes, to wit:

		United States currency.
Farriers	per month	$30.00
Teamsters	do	20.00
Packers	do	18.00
Saddlers	do	17.00
Trimmers	do	14.00
Painters	do	14.00
Carpenters	do	14.00
Stevedores	per day	.50
Ordinary labor	do	.40

The nature of work which each class performed is readily recognized under the headings as classified.

As far as possible I have adopted practically the civil-service rules in handling Filipino labor in this department, my effort being to arouse the ambitions of the various Filipinos who might be classified as skilled laborers.

The native farrier receives more pay than any other class of native labor in this department. There are four of these farriers in this department, and they have practically taken the places of American veterinary surgeons who have been transferred to the line or returned to the United States. Under the guidance of competent American veterinarians they have made marked advance in this profession, and are capable of treating intelligently certain hoof diseases and diseases of even more complicated character without direction.

The teamsters are the next highest paid in this department. In my report made to the chief quartermaster of the division in 1901 I expressed the opinion that while native laborers were capable of great proficiency, yet they would never be able to handle the American animals. Since then I have had occasion to change my mind. Upon receiving authority from the chief quartermaster, I broke in a number of natives to drive the coal and sanitary carts. They are not only honest and faithful in the performance of this work, but remain in the department after hours, so I am told by the superintendent of the corral, to keep their harness greased and clean, their animals curried, and their carts washed. I never found dishonesty among the drivers in the delivery of coal and wood, and I now believe the Filipino native capable of handling the escort wagon wherever the animal is at all well broken. The superintendent of the corral reports to me that there are less accidents and runaways in the train handled by native teamsters than that handled by American drivers. The cause is apparent. The American driver to a great extent is reckless and oftentimes careless. The position of teamster is greatly sought after in this department by natives, and they use every caution and are diligent in the performance of their duties in order to retain their positions. Of the 45 native teamsters in this department during the month of September, 1902, only 7 days' labor was lost. The native is docked if he is not present every morning and evening, and if he does not give a satisfactory explanation is discharged.

It is in the saddler, paint, and wheelwright shops that more skillful labor is required of the native and where he attains a greater degree of proficiency than in any other branch of this department. In the finest work in the wheelwright shop—such as the repairing and rebuilding of vehicles like carromatas, quileses, and carriages—he becomes an expert and almost surpasses any laborer which we can put upon this class of work.

While the American wheelwright gets $85 per month, the native started with $14, until now there are four of them who have reached a salary of $30 per month. Their work is of the highest order, and the foreman of the wheelwright shop is undertaking to break in and train up additional Filipino laborers on account of their constancy in work and the good class of work they turn out. I believe the native wheelwright is capable in time of doing all repair work of a casual character that is needed in these Islands.

All work in the paint and trimming shops is exclusively done by native laborers under a white foreman. When I assumed charge of this department all painting was done by Americans at $75 per month. While painting is not difficult workmanship, yet when carried to a degree of efficiency as in the paint shop of this department, the Filipino reaches a high rank in skilled labor. The same is equally true of the trimmers. All of the upholstering and covering of Dougherty wagons, ambulances, and carriages, as well as carromatas, quileses, etc., is done exclusively by native labor.

In the past I have made great efforts to secure white labor for this branch of work, but was never able to find more than one or two white laborers. The native laborers in the trimming shops, who handle the big sewing machines, as well as doing hand sewing, stuffing, cutting, and trimming, are men who were trained to this work either in this department or at the pony corral. I have had some trouble in retaining this class of labor. As carriage factories would open in Manila they would make a bid for the labor which had become efficient in this department in this class of work, and frequently the best men left this department, being able to secure higher wages elsewhere. This, however, is not a discouraging sign; if any indication at all, it should be to the contrary.

There seems to be no hostility between the skilled American labor in this department and the skilled Filipino. In fact, I have been surprised to see how readily the foremen of the various shops carry out my wishes in this matter in endeavoring to teach and train the Filipino in the various branches of work.

In the unskilled labor this department has been very fortunate in its handling. As an illustration, during September, 1900, all of the storehouses in the department were practically swept away by a typhoon, and native carpenters were very hard to get on account of destruction in other parts of the city and the increased demand for them. I then resorted to the unskilled Filipino labor at 40 cents a day, putting one white man to each forty in rebuilding the storehouses and corral. It was during the height of the rainy season, and it was done with remarkable rapidity and without loss to any property which had been unroofed. Since then any building which has been done in this department has been handled by white foremen and Filipino unskilled labor.

The vast storehouse now being built under contract in this department is wholly done by natives with American foremen. I have carefully noticed from day to day how well they perform this labor and have seen no evidence of loafing or incapacity in handling the heavy timbers.

The foreman of the wheelwright shop reports in most favorable terms upon the native in setting joists and in handling the saw, plane, level, etc.

Filipino laborers are never allowed to be idle in this department. The forage gang, for instance, when there is no forage to handle, is put to policing the corral or rebuilding the roads. This is equally true in the coal department.

When I first assumed charge of the department of land transportation, all the coal in the quartermaster's department was on my papers and handled by me. The work was done at that time by Chinese. I had difficulty, as I thought, in securing proper results from Chinese labor. I then began an experiment of having the Chinese unload the coal on the dock and the Filipinos carry it from the dock to the coal pile, which was the longer run. The results were so satisfactory that the next month I replaced all Chinese labor in this department by Filipinos, and found that the work was not only done as rapidly, but much cheaper.

The work in this department is not of a like character. The transportation which arrives here from the States is ponderous and is difficult to handle. Much of the hardware in the quartermaster's department, such as bar iron and steel anvils, horse and mule shoes, nails, tools, etc., are handled in this department and are unloaded and stored by native labor. All stores of whatsoever character, wagons, trucks, parts of same, forage, paints, oils, etc., are all handled by natives exclusively. Packing boxes are made and repacking of all supplies is done by natives. In fact, with the exception of the teamsters, wagon and assistant wagon masters, foremen and blacksmiths, this entire department in the matter of stores, receiving and shipping, is done by natives.

Forage weighs heavy and is hard to handle. The smallest bale of hay weighs 125 pounds and the compressed bales weigh 260 pounds. The oats average 100 pounds per sack. All hay in this department is piled to great heights. The Filipino takes the lighter bale on his shoulders and carries it over a hundred feet in the air, never putting it down until it reaches the point where it is to be laid, returning for another trip and continuing with little show at skulking. In the case of the larger bales two handle them, or else they are passed from hand to hand. This labor gets 50 cents gold per day.

The other labor throughout the storehouses and that which tends to extra stock, waters and feeds the animals, and polices the corral, is rated at 40 cents gold per day.

When I first assumed charge of this department in August, 1900, all labor was paid by the day, except in a few cases where it was paid weekly. I did not believe it possible at that time to pay them any differently, or that they would accept new conditions. It involved a vast amount of labor and had a demoralizing effect upon the Filipinos themselves. At that time all labor needed was secured through patrones or bosses. While I and other quartermasters in the city would pay the native himself for the work performed, he would in turn put it in the hands of the patron, who would extract a certain percentage, giving him the balance. This was the hardest problem which we had to meet; if we attempted to prevent it, the patrones would prevent us from securing labor. On two occasions all the loading and unloading in this department had to cease because I discharged the patrones and stationed guards to prevent laborers from giving their pay to the patrones. A continuous warfare on this system of an anterior date has now resulted in a complete alienation of laborer and patron as far as this department is concerned. The Filipino has become thoroughly convinced that not only is he independent of the patron, but to be subservient to him is against his interests. I believe this was largely brought about by paying the labor first once a week, then twice a month, and later on monthly.

Tagalog and Spanish interpreters would tell them, as they were paid, not to give up any of their money to anyone, and that they could always get work here. I knew of only one case where a white man in authority attempted to collect from the natives, and an imprisonment in Bilibid Presidio for six months had a wholesome effect.

The pay of native laborers in this department has only once been increased since I assumed charge. The native labor which was formerly paid 40 cents gold per day for stevedoring made a demand for 50 cents, which was the amount paid by the stevedores of the army transport service, and this advance was met. One hears a great deal about the high rate of pay of native labor in this branch of the quartermaster's department; reference to figures above will show this to be untrue. As labor became skilled it has been classified and the rate of pay fixed; but there has been no material advance in the pay for labor in this department since August, 1900. The men work for the same sum as they did then.

I became thoroughly convinced, on assuming charge of this department, that the Filipinos were entitled to the labor of these islands as far as it was possible to give it. I have made every effort—at times it seemed almost a sacrifice—to advance this cause. My efforts in this direction, however, have more than repaid me for the experiment, as I am not only able to get all the labor I want, but have seen the Filipino develop from what might be termed a shiftless laborer to a constant worker. As long as he was paid by the day, and his work was uncertain, it mattered little to him whether he laid off a day or two, or even three, within a week. He is now paid by the month, and under no conditions is this rule broken.

The following facts which are taken from the time books and pay rolls of this department for the month of September show a result which surprised even me in the matter of constancy in their work.

Take the number of men employed regularly for the month of September, which were 643, and the working days at 26, the total number of days is 16,718 for the month, against time lost 583 days. This shows a percentage of time lost of 3½ per cent, or an attendance of 96½ per cent. The number of emergency or extra laborers is not included in this percentage.

When a ship is to be discharged I take on what is known as emergency or extra labor, work it for a week or two, as the case may be, and then drop it at the end of that time, but wherever the native is employed by the month and paid by the month, the books show that the percentage of absentees is not greater than among the American labor of this department. Without going into more complicated figures, I doubt very much if the American labor would not have a greater percentage of absentees in proportion.

Owing to the fact that the civil governor asked most particularly about the constancy of Filipino labor, these figures have been carefully made and are fully reliable.

As to the physical strength of the Filipino for lifting and doing other strong work, the remarks made above in the matter of their handling forage would illustrate their capacity for work of this character. What they lack in physical strength they seem to make up in knack or a physical trick which they exercise adroitly in handling heavy cargoes.

I fully realize that the conditions in the provinces are not so favorable as they are in Manila for the organization and development of labor, but I am of the opinion that while the progress may be slower there than here, still the same evolution and development will occur, and will become all the more rapid as the native becomes convinced of the sincere and earnest attitude of the Government toward his labor.

I have the honor to attach hereto extract copies of my reports made to the chief quartermaster of the division in the year 1901 and the year 1902, which, taken in conjunction with this report, will give a practical illustration as to the development and evolution which have been made by native labor in this department since August 1900.

Very respectfully,

Archibald W. Butt,
Captain and Quartermaster, U. S. Army,
In Charge Land Transportation.

[Extract copy of annual report for the fiscal year ending June 30, 1902, forwarded to the chief quartermaster, Division of the Philippines, Manila, P. I.]

* * * * * * *

At one time emergency native labor was paid at the close of each day's business, and native labor employed regularly in corrals, storehouses, wood and coal yard, and on forage was paid semimonthly. Now they are all paid once a month, same as white labor.

Those persons discharged during the month are paid on same day discharged on an open roll.

In connection with the employment of native labor, I desire to state that two years ago it was almost impossible to employ any large number of men except through the padrones, who exacted from the men at least 20 per cent of their wages; in fact it was the custom at one time for the laborer to turn over his entire earnings to the padrone, who kept that proportion of the money he saw fit.

This office undertook to break up the custom so far as this department was concerned and succeeded. The padrones were kept away from the premises, and the men made to understand that they were hired direct, and were under no obligation to anyone, that the money they earned was all theirs and that no portion of it should be given the padrones.

In several instances it was discovered that the native foremen were taxing the men under them a certain percentage of their earnings. The foremen were promptly discharged and the reason therefor explained to the men.

In one case a white foreman was detected in this practice. He was discharged, arrested, prosecuted in the criminal court, and sentenced to a term of imprisonment for the offense. This had a most wholesome effect on all concerned.

[Extract copy of annual report for the fiscal year ending June 30, 1901, forwarded to the chief quartermaster Division of the Philippines, Manila, P. I.]

* * * * * * *

It is the policy of this office to utilize native labor wherever it is possible. The bulk of the labor in the paint shop is done by natives. They assist in the repair shops, the veterinary hospitals, in the saddlers' shops, and in rigging aparejos. They also do the stevedore work in the shipping of forage, fuel, etc.

It may be of interest at this point to note that the native labor is capable of the most expert workmanship in many branches of the quartermaster's department. While they do not make good teamsters, solely by reason of the fact that they do not possess the necessary strength to handle the army mule and draft horse, yet as painters, carpenters, saddlers, trimmers, etc., they excel, and while the American occupation has raised the price of native labor, still it remains at a very low figure when compared with other labor in the islands.

* * * * * * *

I am convinced that under the direction of American foremen native labor is capable of attaining the greatest excellence in the branches above enumerated. Moreover, there appears to be no friction whatever between American and native labor, the two working side by side in perfect harmony and without any racial prejudices. The native seems anxious to learn the American methods, and in this department applies himself to carrying out the directions of the American foremen. The importance of this matter can not be exaggerated, for it seems to be opening up a solution of what would otherwise be a very difficult problem in the government of these islands. An earnest effort has been made in this office, wherever the races come together in great numbers, to bring about good feeling and fellowship between them. The natives have been taken into the shops, and the American foremen have evinced at times a patience and an earnestness in directing them in the skilled artisan's work which has surprised me, and which illustrates to a marked degree the liberal mindedness of the American workman.

* * * * * * *

In this connection it may be well to call attention to the excellent work of the Filipinos as carpenters when working with skilled American labor and under its supervision. For a time an effort was made to secure Filipino carpenters; but, this being impracticable, unskilled labor was employed, and very little instruction was needed to make it efficient with the saw, the plane, and the level.

* * * * * * *

One hears a great deal of the necessity of introducing Chinese labor into these islands to meet the demands. It has been my experience that any labor which can be performed by the Chinese can be performed equally well by the Filipinos. The latter, moreover, have marked advantages over the Chinese, inasmuch as they are more amenable to discipline, more imitative in their methods, more enthusiastic in their work for the work itself, and more easily assimilated by American workmen. While most of the coal is unloaded in this office by Chinese labor, employed by contractors, yet all the loading of coal from this office is done by Filipino workmen at $0.40 gold per day. I have studied carefully the efficiency of these two classes in this particular work, and I unhesitatingly pronounce in favor of the Filipino. The Filipinos are certainly far superior to the Chinese in loading and unloading forage. Moreover, they show adaptability in handling the live stock and in workmanship in the repair and saddlers' shops, which I do not believe can even be equaled by the Chinese labor in these islands. I have dwelt at some length on the efficiency of Filipino labor, which as yet is in its infancy in expert work, for the reason that I have to handle a vast amount of it, and have studied it to an extent where I think my opinion may be of some value.

* * * * * * *

A true copy.

Archibald W. Butt,
Captain and Quartermaster, U. S. Army, in Charge Land Transportation,
Manila, P. I.

I am satisfied that the labor of this department is now entirely freed from the padrones. The men appreciate the new order of things, and are apparently contented and, notwithstanding the demand, at any time this office can readily secure all the labor required.

The Filipino is not dissimilar to the majority of mankind in that he is anxious to obtain regular employment, and when secured will do all in his power to retain it.

While the wages paid the natives are somewhat in excess of the wages paid in the past under the Spanish régime, still they are very low, but this enables the Filipino to provide something else than rice and dried fish for his family.

When once a native becomes accustomed to eat meat once or twice a week and to provide the same for his family, from that time he can be looked upon as a high-class and steady laborer, and works willingly and hard in order to insure his family from a return to the old conditions which confronted him and his.

The fact that the men are paid regularly, furnished steady employment, and are not paying anyone for the privilege of working, is having its effect on the laboring classes throughout the city in getting away from the clutches of padrones and others who have been robbing the laborer of his earnings.

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A true copy.

Archibald W. Butt,
Captain and Quartermaster, U. S. Army, in Charge Land Transportation, Manila, P. I.

Office Superintendent Land Transportation,
Manila, P. I., October 23, 1902.

Capt. A. W. Butt,
Quartermaster, U. S. Army, in Charge Land Transportation,
Manila, P. I.

Sir: Replying to yours of this date as to my experience in regard to the Filipinos as teamsters, mechanics, and laborers in this corral, also in answer to your question as how they compare with Chinese laborers, I have the honor of submitting the following report, based upon my personal observations in this corral and as superintendent transportation of the China relief expedition:

Filipinos as laborers.—I would respectfully state that they have proven highly satisfactory, and it is remarkable, out of the large number employed, how few are absent during the month; the percentage is less than 5 per cent.

As teamsters.—The experiment has been a great surprise to me. During the past twelve months train No. 5, consisting of 45 carts of different kinds, working one mule each, has been handled entirely by native teamsters, excepting the wagonmaster and the assistant wagonmaster, who are Americans. In care of these animals and harness no fault can be found; each one seems to try to have a better looking rig than the other. I doubt, however, whether they will be able to handle with safety more than one horse until they become accustomed to the large draft animals. They handle the escort wagon train in some departments in the city now, but owing to their timidity I have not, up to present time, utilized them on anything but the single American horse or mule. I have in this train more than twenty native teamsters that have been driving for the past twelve months, and during that time they have not been absent a day. This may in a measure be due to the strictness of the rules of this corral, yet, nevertheless, it shows where they are properly handled they make steady and faithful men.

Native mechanics.—We employ 50, mostly as trimmers and painters, their work has been most satisfactory and daily attendance prompt.

Native laborers.—In the corral proper are employed a great number who are used to police the yard and stables and taking care of extra stock. Fifty are used in the different storehouses to take care of the different articles stored therein, and in every instance their services have been faithful and satisfactory. The supply of each kind has at all times been more than equal to the demand.

Native laborers v. *Chinese.*—Since my arrival in the Philippines I have had no experience with Chinese labor, yet during the ten months I was in China with the China relief expedition I had to use Chinese labor exclusively in the same capacity as I now use Filipino help, and for this work I prefer the Filipino, as he is quicker to pick up a thing, and at the same time takes more interest, consequently more pains with his work.

Respectfully,

J. E. Cole,
Superintendent Land Transportation.

A true copy.

Archibald W. Butt,
Captain and Quartermaster, U. S. A., In Charge Land Transportation.

MANILA, P. I., *October 24, 1902.*

A. W. BUTT,
Captain and Quartermaster, U. S. Army,
In Charge Land Transportation, Manila, P. I.

SIR: In reply to a question as to what I think of the efficiency of the Filipino laborers, I have the honor to report that I have ever found them as mechanics to be steady and industrious. The blacksmiths, wheelwrights, saddlers, painters, trimmers, and carpenters in this department will average in skill with any class of mechanics, taking them as we pick them up. Their attendance averages 95 per cent.

I would recommend that more blacksmiths and wheelwrights be hired, as this is a good place to teach them the use of American tools.

Respectfully,
C. F. LANE,
Superintendent of Shops.

A true copy:

ARCHIBALD W. BUTT,
Captain and Quartermaster, U. S. Army,
In Charge Land Transportation, Manila, P. I.

OFFICE LAND TRANSPORTATION,
Manila, P. I., July 25, 1901.

The CHIEF QUARTERMASTER,
Division of the Philippines, Manila, P. I.

SIR: I have the honor to request authority to employ Filipinos as teamsters. I am convinced that by judicious handling the Filipino can be taught in a very short time to handle a team of mules or horses in an escort wagon. I tried the experiment, introducing them in the rigging shop, saddlers' shop, and paint shop; also as farriers, and lastly as packers. The paint shop is now run entirely by native labor, with the exception of one American foreman, and in every branch in which they have been trained with patience and earnestness they have shown an adaptability at the work which is surprising.

I have had the school for native packers running only for a short time. They take to the pack readily, and, after getting accustomed to the mule, do good service as mounted packers.

My idea is to take picked natives, place them on the escort wagons, teach them slowly the various parts of harness, how it can be mended if it should break while on the road, and drill them in the important but minor details of harnessing their teams. At first I would put them on the dump and sanitary carts, where they would have to handle only one horse or mule. Most of these animals which are used for this purpose are docile and well trained, and I would anticipate little trouble in substituting, by degrees, of course, native for American teamsters. I do not desire to make this change radical, or all at once, but merely wish to prepare for a day when this office will be compelled, more or less, to rely on natives as teamsters.

I believe, if granted this authority, it would have a good effect on the natives themselves, as I have always found them ready to respond to any effort to advance them in the direction of well-organized labor. To this end I ask authority to pay native teamsters $20 gold per month.

Respectfully,
ARCHIBALD W. BUTT,
Captain and Quartermaster, U. S. Army,
In Charge Land Transportation.

A true copy:

ARCHIBALD W. BUTT,
Captain and Quartermaster, U. S. Army,
In Charge Land Transportation, Manila, P. I.

HEADQUARTERS DIVISION OF THE PHILIPPINES,
Manila, P. I., November 5, 1902.

His Excellency the GOVERNOR,
Philippine Islands.

SIR: The opinions Captain Butt expresses respecting value and effectiveness of native labor are concurred in, but the payment of wages to natives such as now prevail, it seems to the undersigned, is all wrong; first, because it is not necessary;

second, because it fixes an unalterable standard which all others wish to profit by, and, third, because it confuses and disturbs all labor values.

The policy of the army in Manila, it seems to me, in respect to wages paid is about as bad as bad can be, but no one person has now the power to correct it. The price of hemp, sugar, coffee, and copra is fixed in the great consuming centers of the world, and are subject only to such fluctuations as supply and demand cause. Americans set a pace respecting remuneration of labor that none without a national treasury behind can follow. The fact that labor now costs twice or thrice as much as formerly has not resulted in a corresponding increase or any increase in the value of hemp in London or of copra in Havre. It seems to me that the expansion of the cost of labor here has worked a great injury to the Filipino people and their commerce.

In the Quartermaster's Department of the Army, at various headquarters, there are now employed over 227 persons who receive over $100 gold per month; at the same places there are an equal number who receive from $100 down to $40 per month, and it seems to me that almost all these persons should be natives and that the general policy of the military here should be to utilize the services of the Filipino wherever possible, but it is not easy to do this, as most of our officers are too much disposed to condemn the native and to insist that only American clerks, mechanics, etc., are able to do what is required of them.

Very respectfully,

Geo. W. Davis,
Major-General, U. S. Army, Commanding.

EXHIBIT F^3.

CITY ENGINEER OF MANILA—LABOR.

CITY OF MANILA, MUNICIPAL BOARD, SECRETARY'S OFFICE,
October 31, 1902.

The ACTING EXECUTIVE SECRETARY,
Manila, P. I.

SIR: Replying to the request of the honorable civil governor, of recent date, relative to the labor employed by the city, I am directed by the municipal board to herewith hand you the inclosed report thereon by the city engineer, which is concurred in by the board.

Very respectfully, (Signed) BERT EDDY,
Acting Secretary.

[Inclosure.]

CITY OF MANILA, DEPARTMENT OF ENGINEERING AND PUBLIC WORKS,
Manila, P. I., October 30, 1902.

SECRETARY MUNICIPAL BOARD,
Manila, P. I.

SIR: I have the honor to submit, in compliance with the request of the governor, the following replies to questions regarding the labor employed by this department:

1. Q. The number of laborers employed?—A. The city employs 1,714 laborers of all classes.

2. Q. Whether they are classified, and if so, into how many classes?

3. Q. What the nature of the work which each class does is?

2 and 3. A. The employees group, generally, under three heads—overseers, mechanics, and laborers. The laborers are usually divided into two or three classes, the more important work being given to the higher class.

4. Q. Whether they employ any skilled labor, and whether that is classified?—A. Mechanics and skilled laborers are not regularly classified, but are graded in pay according to their skill.

5. Q. What the wages are which are paid by them to each class of laborers?—A. Ordinary laborers are paid $1, 80 cents, 70 cents, and 60 cents per day, local currency. A few assistants to janitors get 50 cents and 40 cents.

6. Q. When the wages are paid, whether at the end of each day, at the end of each week, or at the end of the month?—A. All wages are paid monthly.

7. Q. Whether they have difficulty in securing labor?—A. No difficulty is experienced in securing ordinary labor. It is not always easy to find skilled labor for temporary employment.

8. Q. How many hours a day the laborers work?—A. Eight hours constitute a day's work.

9. Q. Whether their labor is efficient or not?—A. Labor is fairly efficient and is improving. Labor in the city compares very favorably with that in the provinces. At present, considering wages and efficiency, work costs about 20 per cent to 25 per cent more than in the United States.

10. Q. Whether they employ any Chinese labor for the same work, and if so, how in efficiency the Filipino laborer compares with the Chinese?—A. No Chinese labor is employed by the city. Experience on contract work indicates that a Chino laborer will do about 20 per cent more than a Filipino. Their value is further augmented by the fact that they require less close superintendence.

11. Q. I should also like to ask particularly with reference to the constancy in attendance of the laborers; whether they lie off for a day or two after Sunday; what their physical strength is for lifting and other hard work; how the rates paid by the

city compare with those paid by merchants for similar work?—A. The best grade of laborers and mechanics are as steady as could be wished. The class of men that spend Sundays at the cock pits around Manila are not to be relied upon after Sundays and fiesta days. This class, at least on the city rolls, is decreasing. The capacity of laborers for heavy work is quite up to the standard of their size. They are, however, not as willing to exert it as other races. Much can be gotten out of them under excitement or by stimulating them. As a rule the wages paid by the city are equal to those paid by private concerns. In some cases higher rates are paid to attract good men for a particular purpose. On an average our rates are probably somewhat higher for this reason.

Respectfully submitted.

(Signed) ROBERT McGREGOR,
Captain of Engineers, U. S. A., City Engineer.

EXHIBIT G.

PHILIPPINES CONSTABULARY.

HEADQUARTERS OF THE PHILIPPINES CONSTABULARY,
Manila, P. I., August 31, 1902.

The SECRETARY OF COMMERCE AND POLICE,
Manila, P. I.

SIR: I have the honor to submit herewith a report of the operations of the constabulary for the first year of its existence, ending July 31, 1902. The accompanying detailed reports of Assistant Chiefs Baker, Taylor, and Garwood, and of Superintendent of Section of Information Currey leave little for me other than to make comments and recommendations of a general nature.

Assistant Chief Atkinson left here for the States, seriously ill with a disease that threatened to deprive him of command of his voice and control of his legs and arms. No news has been received of him since his departure.

The excessive work that has devolved upon the constabulary since its organization has made it impossible to impart the instruction in drill and discipline that is necessary to make it a body worthy of the position it should occupy and the duties for which it has been created.

In general, it may be said that as soon as forces were formed in the various provinces they were sent after insurrectos or ladrones, and they have had but little respite from excessive field work since.

The four years' fighting, aided by the loss of life by cholera and plague, of animals by rinderpest, and of crops in many places by locusts, has been demoralizing to the people and favorable to the development of ladronism. With an agricultural and commercial improvement will come better peace conditions.

THE LAST OF THE INSURRECTION.

The campaign inaugurated by General Bell in the provinces of Laguna and Batangas and carried to a successful issue was the death knell of the insurrection; but it remained for the constabulary in its Leyte campaign, ably conducted by Assistant Chief Taylor, to administer the coup de grace.

While the military forces were relentlessly harrying the insurrectos of the two above-mentioned provinces, the constabulary in Cavite, increased by detachments from several other provinces, under Assistant Chief Baker and in Tayabas, also considerably increased under different inspectors, was acquitting itself with decided credit and effecting valuable results.

It was expected that both the Negros provinces, especially western Negros, would be the scene of a long and difficult campaign. It is gratifying to state, however, that by the combination and cordial cooperation of the Sixth United States Infantry with the constabulary nearly all of the guns held by the fanatical bandit Papa Isio have been secured and practically all the leaders (except Papa Isio) have been captured or killed. This result has not been accomplished without strenuous efforts in both provinces, for which Senior Inspector Orwig and his command deserve special praise.

Bands of ladrones continue to infest nearly all the provinces and some of them still claim to be "revolucionarios;" but all Filipinos of intelligence recognize that such a claim is without foundation of fact.

The campaigns in Rizal, Bulacan, Misamis, Sorsogon, and the numerous successful expeditions made in other provinces prove that the destruction or imprisonment of lawless elements, wherever they be, will surely be effected, and it is believed the people will eventually recognize that the law only is supreme. The campaign against Colache in Sorsogon under Senior Inspector Nevill, vigorously aided by Provincial

Governor Monreal, stands as one of the most successful exploits in the annals of recent Philippine history. Attention is invited to Assistant Chief Garwood's remarks on this subject in his accompanying report:

> There exists still a mild form of agitation kept up for the most part by unscrupulous leaders who desire to retain a following, probably for political reasons, and who desire to earn their living by the sweat of the brows of others. There are also a few who, possibly in good faith, cherish the idea that independence will come in some manner that they do not clearly define. Such as these constitute the basic elements of Filipino nationalism. In this category are those who would make believe that the successful rally will be made around those who continue irreconcilable and who will continue to lead the minority. In this category are also a few who believe that it is good policy to show sympathy if not actual aid to the bandits, some of whom are ex-revolucionarios still out in the mountains.

GROWTH OF THE CONSTABULARY.

With the continuous extension of civil government the constabulary has been obliged to increase its numbers and enlarge its sphere of activity. In several provinces the limit of strength prescribed by the organic act was found inadequate to meet the situation, both as regards inspectors and enlisted men. This was remedied by an act of the Commission, No. 416, dated June 9, 1902.

The necessity of furnishing rations to the constabulary, the growth of the civil-supply store, the guarding of provincial jails, the taking over of certain telephone and postal lines, and other matters of general welfare, are increments to the duties of the constabulary.

Owing to much field work and to the requirements of their own forces, inspectors have in many provinces not yet taken active supervision over the municipal police, as contemplated in sections 12 and 13 of the organic act.

YEAR'S WORK AND OTHER STATISTICS.

Insurgents killed, 11; captured, 35; surrendered, 360; ladrones killed, 663; captured, 2,802; surrendered, 707.

Arms captured or surrendered: 1,316 rifles and carbines, 381 revolvers, 186 shotguns, 14 cannon, 6 muskets, and 186 native-made guns, or a total of 2,089 firearms. The numerous bolos, spears, and bows have not been taken up on returns.

Ammunition captured or surrendered: 11,691 rounds of rifle and shotgun cartridges, 155 cannon balls, 6 cases of 1-pound rapid-fire shells, and 1½ cans of gunpowder.

Numerous cuartels, with their primitive plants, have been destroyed.

Stolen animals recovered: 738 carabaos, 162 horses, and 59 head of cattle.

Expeditions reported: 2,736, covering distances amounting to 110,466 miles.

Casualties: Inspectors killed, 2; enlisted men killed, 20; inspectors wounded, 1; enlisted men wounded, 40.

Strength, July 31, 1902: 193 inspectors, 5,317 enlisted men.

The constabulary is occupying 202 stations, the army 195, the tendency being toward an increase of the former and a decrease of the latter.

Strength of the army: Four companies of engineers, 7 companies of artillery, 68 troops of cavalry, 128 companies of infantry, 2 companies of signal corps, 52 companies of scouts, or a total of approximately 20,000 whites and 5,000 natives.

The following table, except as to the Philippines, taken from the report of Prof. Jeremiah W. Jenks, recent United States commissioner in the Orient, is self-explanatory:

Provinces.	Police, sanctioned strength.	Population.	Proportion police to population.	Proportion police to square miles.
Madras	22,764	38,582,662	1 to 1,695	1 to 6.
Punjab	20,440	20,860,913	1 to 1,021	1 to 5.
Asaam	2,480	6,484,258	1 to 2,211	1 to 20.
Bombay	15,606	15,163,506	1 to 972	1 to 5.
Bengal	24,639	70,488,675	1 to 2,873	1 to 6.
Number western provinces	35,270	46,905,086	1 to 1,330	1 to 3.
Burma	12,916	6,260,786	1 to 646	1 to 16.
Philippines	5,500	8,000,000	1 to 1,440	1 to 25

The following shows the volume of business of civil supply store from November 1, 1901, to July 31, 1902:

Cash sales	$57, 354. 62
Invoiced to supply officers in provinces	105, 089. 02
Total	162, 443. 64

Number of organized provinces containing constabulary forces, 40; ponies on hand, 750. This is little more than half the number turned over by the military authorities, the others having died from various causes, including glanders and surra. Many of them were, however, miserable specimens of ponies when received, and had no value.

The four steam launches turned over by the bureau of coast guard and transportation and now used by this bureau have been of material aid at all times, but especially during the periods of the campaigns previously mentioned.

It is difficult to form any definite idea of the quantity of unlicensed serviceable arms in the archipelago, but it is not believed that the number will exceed 1,000, many of which are buried and becoming useless by reason of rust.

PROSPECTIVE.

When the undersigned, in December, 1901, expressed the opinion that 15,000 white troops, 5,000 native scouts, and 5,000 constabulary would suffice to maintain order in the archipelago by January, 1903, it was received with much incredulity. Fortunately there has been an almost complete vindication of the claim, and I doubt whether any unprejudiced person will now question the statement.

As this matter is of interest to the higher authorities by reason of excess of cost of white troops over natives, and feeling convinced of having a fair knowledge of the situation, I take the liberty of stating that, in my opinion, within six months from the date specified above—that is, by July, 1903—a force of 10,000 white soldiers, with the constabulary and scouts working in cordial cooperation, will suffice to meet all requirements connected with the maintenance of order in the Philippines. Whether it be the policy of the Government to keep troops in excess of the necessity of the archipelago I am not aware. Strategic and political reasons could be advanced for making this country a place d'armes.

In connection with this subject I desire to invite attention to the following indorsement on cable request of the governor of the province of Tayabas to the civil governor of the Philippines, referred to me for comment and recommendation:

"Headquarters Philippines Constabulary,
"*Manila, P. I., September 3, 1902.*

"Respectfully returned to the executive secretary, through the secretary of commerce and police. The services of the companies of scouts referred to would unquestionably be of much advantage in running down Rios's band. The same may be said of the use of companies and detachments of scouts in other provinces for similar ends. This matter involves the general policy to be pursued with respect to the scouts.

"In accordance with general orders No. 152, Headquarters Division of the Philippines, July 7, 1902, appears the following:

"'To insure justification to the military, said call must in every case be official and in writing, and to specifically mention the service to be performed, and also state that the civil authorities are unable to cope with the emergency.'

"As it would not be strictly true to say that the civil authorities are unable to cope with the emergency, it is not feasible to secure the services desired unless the above order be modified or an exception made in this case.

"If the scouts were under the immediate control of the chief executive of the archipelago, no formality would be required, no friction caused, nor interference with the municipal government produced in such cases as this.

"Since the scouts can never be considered from the point of view of moral effect in the same class with the American troops, it would seem that they should show by their usefulness the cause of their existence. The number of American troops to be maintained in the islands will always be a function of the number of guns out in the hands of the native troops and constabulary.

"The entire native contingent should be readily available for field service and kept at the minimum strength compatible with the work to be done.

"From the above it follows that a diminution would be effected in numbers in the three classes of land forces—a long stride in behalf of the commercial phase of the Filipino holding.

"Under the circumstances, the undersigned can make no recommendation other than that the entire policy of the use of the scouts receive early consideration by higher authorities.

"(Signed) "HENRY T. ALLEN,
"*Chief of Constabulary.*"

In accordance with your instructions (verbal), separate recommendations will be made concerning the native contingent.

ABUSE OF AUTHORITY.

Experience has demonstrated the necessity of a rigorous supervision over the actions of the various constabulary detachments to prevent abuses of authority, and to encompass this end it early became evident that the number of white inspectors should be increased. In view of the practices so long in vogue the success so far achieved in preventing abuses has been fairly creditable, but it has not been secured without the dismissal of several inspectors and the prosecution before civil courts of many members of the corps.

IN GENERAL.

Some of the Filipino inspectors are showing marked capacity for the work assigned them, but it is believed that in the future those educated in the ranks will prove the most valuable.

The standard of inspectors is being gradually raised, and I continue to believe that, considering their duties and responsibilities, their pay is fully earned, and is probably less than that of any other bureau.

The constabulary has by its work completely proved that it is a success, and it is fast winning the confidence of all persons living in the Philippines. I may also add that during the year just ended the cost of the force has been kept within the estimated limit of $250 gold per man.

Very respectfully,
HENRY T. ALLEN,
Chief of Constabulary.

HEADQUARTERS FIRST DISTRICT PHILIPPINES CONSTABULARY,
Manila, P. I., August 25, 1902.

The CHIEF PHILIPPINES CONSTABULARY,
Manila, P. I.

SIR: I have the honor to submit the following report covering the first district Philippines constabulary from its beginning, August 1, 1901, to July 31, 1902:

CHARACTERISTICS OF THE PEOPLE.

The first district comprises all of Luzon north of Cavite and Laguna and west of Infanta and Principe, but since January Cavite has also been attached to it.

Roughly speaking, throughout this territory the natives are grouped into a small dominant aristocracy and a large subservient commons. Merchants and shopkeepers belong to one or the other of these classes—usually the upper one. There is practically no middle class—in other words, society is feudal in its organization and while the well-defined rules and regulations on which such a system has been based in occidental countries are lacking, its influences are none the less potent. Originating in family ties and not land ownership, clan rather than locality defines it.

Having the education, wealth, and power, it was the aristocratic class in Spanish days, and to the greatest extent in American days that the Government has dealt with. The easy-going, peace-loving, and improvident gente have always blindly followed the lead of the principales.

CHARACTERISTICS OF THE PROVINCES.

The Cagayanes, who dwell in Cagayan, Isabela, and Nueva Vizcaya, are almost too docile and submissive. Over them the small but unscrupulous upper class and the foreigners controlling the tobacco industry have exercised unquestioned and at times unbridled power. It is the danger of this and not of ordinary lawlessness or disorder that should be guarded against by the Government.

Instrumental in this work during the past year has been Judge Blount, of the court of first instance, cordially assisted by the constabulary officers. It is regrettable that the size of his circuit, which also includes an Ilocano province, prevents his giving to these people his entire time and care.

The Cagayanes people the valleys only. The mountains that encompass them on all sides are given over to the Igorrotes, small, head-hunting bands of whom make periodical but trivial raids on the valley people.

The Ilocanos, a sturdy, industrious but stolid race, are not confined to the provinces of Ilocos Norte, Ilocos Sur, Abra, and Union, but have pushed their way east into the Cagayan Valley and south into Nueva Ecija, Pangasinan, and northern Tarlac.

Tillers of the soil, they are land hungry, and absorb it wherever they go. An orderly, peace-loving people, their provinces have been almost wholly free from lawlessness, disorder, and even thieving. The upper class in Ilocos Norte and Ilocos Sur, who suffered severely during the insurrection, tolerate but hardly cooperate to the extent desirable with our Government. They possess great power and influence, not always rightly directed.

The Igorrotes, clear-eyed, muscular and deep chested, honest and heathen, timid in manner but courageous in fact, herders and hunters, thinly populate Benguet, Lepanto, Bontoc, and the mountains of the Ilocano and Cagayan countries. Except for their head-hunting forays, which persuasion could stop, they give no trouble. Physically they form the best military material in Luzon. The Bontoc constabulary is composed entirely of Igorrotes, and the attempt to give them the training and discipline necessary to soldiers is an interesting experiment.

In this district the Tagalo, brighter and more volatile and with less of moral fiber than the others, as fond of intrigue as of work, easily infected with lawlessness and with rhetoric, peoples Cavite, Bataan, Rizal, and Bulacan, dominates Nueva Ecija and Tarlac, and is not without influence in Zambales and Pangasinan.

The Pangasinanese and the Pampangans are bright, soft, pleasure loving, and not overly hardworking.

The Zambalans are an equal mixture of Tagalo and Ilocano, and the Nueva Ecijans are Tagalo and Ilocano, but in all these provinces there are well-marked substrains. In northern Zambales the unreconstructed Manalan still hides and intrigues.

The Mendegorin band, operating in southern Zambales, Pampanga, and Bataan since Spanish days, was the first one destroyed by the constabulary.

The ladrone Gonzales, with a small but well-armed band, while terrorizing the southern pueblos of Zambales was defeated by constabulary and driven into Bataan, and later again defeated by marines and constabulary cooperating with each other. The leader is now in hiding and his band dispersed.

In Pangasinan the ruthless exactions of petty officials in remote towns and the too frequent lifting of carabaos have kept the constabulary busy.

The same problem in Tarlac, poverty stricken and too often used as a last refuge by outcasts of other provinces, has been solved, and the leaders and most of their followers punished. Tarlac to-day is as law abiding as Union and Abra.

Southern and eastern Nueva Ecija have always been infested by road agents and cattle thieves. The process of apprehension and punishment has been unremitting under American government, and especially during the last year. It is having marked effect. Western Neuva Ecija is a no-man's land.

The water pirates who haunted southern Pampanga are well under control. The province is not free from carabao thieves and a burlesque ladronism, that usually ends in nothing more tragic than the provincial prison at Bacolor.

Bataan is blessed with barren annals, but among all classes there is quiet but persistent opposition to the payment of rents for "fraile lands."

THE CONSTABULARY.

The organization of the provinces then under civil government began in August, and by the end of December was in progress in every province.

The officers intrusted with this task were instructed to enlist slowly and exercise great care in selecting their men. So well has the spirit of these instructions been observed that in about half of the provinces the constabulary has not yet been recruited to the strength authorized, and the number of desertions in a force now numbering over 2,200 has been only about 7.

Except in Cagayan, where the demand for labor at a high price is constant, there has been no trouble in obtaining a suitable class of recruits, notably in Abra and Nueva Vizcaya, where the constabulary is composed of the sons of the most prominent families in these provinces.

The markets of Manila and other oriental cities proved unable to supply our needs. The cañamo cloth adopted temporarily is still in use for uniforms, and of the cloth selected for permanent use only a small consignment, and that of inferior quality, has reached here. Underclothing, an adequate supply of shoes, suitable field headgear, and rain coats are still wanting.

The first armanent was a motley collection of Remington shotguns, captured Remington rifles, and old caliber .45 revolvers, strengthened by loan from the military of a few hundred Krag carbines.

When the variety of weapons and the often defective ammunition that had to be used for them is considered, it is a matter for congratulation that the constabulary did such uniformily good work and met with no disaster.

The armament finally adopted for the constabulary, 80 per cent Springfield carbines and 20 per cent Winchester shotguns, is well suited to their needs. The revolvers now arriving from the States seem rather heavy and unwieldy. The shotguns sent out for the use of municipal police have caused several severe accidents, due primarily to defective cartridges, but also to glaring defects in the material and construction of the gun itself.

It is believed that time will prove that the handiest weapon for municipal police, and adequate eventually to all its functions, is the .45 caliber revolver, an adequate number of which are here or en route.

The Remington rifles, spurned by the military and used by the constabulary only to arm jail guards, might be shipped to the United States and sold as curios.

The question of water transportation has just lately been solved by assigning a large launch to each district, and contracting for the placing of a badly needed boat on the Cagayan River.

The small launch *Pepe* should be retained for service on Laguna de Bay, and another launch of the same class purchased for use on the Cagayan de Misamis in Mindanao.

The question of land transportation is even more difficult, and has not yet been satisfactorily solved.

The ponies turned over by the military were in a poor and run down condition. Both they and the few that have since been purchased have suffered severely from glanders and surra. It has been finally decided to assign only sufficient mounts in all provinces for the officers and small patrols; to maintain pack trains at San Esteban for the carrying of supplies into Lepanto and Bontoc; at San Fernando, Union, for transportation into Benguet, and at San José and Bayombong for use on the long overland route from Bautista via Boyombong to the headwaters of the Cagayan River.

For the train at Bayombong humpbacked bulls are to be experimented with.

The peculiar geography of Zambales, Ilocos Sur, and Ilocos Norte, and the extent and dense population of Pangasinan will require for them a greater portion of mounts than for the other provinces.

In the needy matter of transportation, both by land and water, the army has rendered great and cordial assistance.

While the native officers have generally less energy, decision, and persistence than their American comrades, and are apt, if given a free hand, to allow abuses, their general efficiency has been an agreeable surprise.

Of the American officers appointed from the Regulars, Volunteers, and a few from civil life, most of those who have remained, and they are in the majority, have proved themselves energetic, efficient, and tactful. The ruthless weeding out that has and will have to continue has been necessitated by whisky, queridas, and want of tact, so aggravated by the climate as to render some impossible for the delicate duties that fall to the lot of a constabulary officer.

Constabulary officers are performing hard, constant, responsible, and dangerous duties, and are the poorest paid servants of the insular government; their positions are no more secure than those of officials in the civil service.

The assistant chief intrusted with command of all the constabulary and supervision of all the municipal police in the Visayas, receives $750 less than the chief of police of the municipality of Manila.

The material from which to draw junior officers is still ample, but that for the highest and most responsible positions is sadly lacking in the organization itself. Only salaries commensurate with those paid in other bureaus will remedy this.

LADRONISM.

Ladronism, which may be defined as brigandage, land piracy, or freebooting, has always flourished in Malay lands.

The Cagayan is too timid, the Ilocano too sensible, and the Igorrote too honest to take to it extensively or seriously. The Tagalo has it in his blood. Tradition, vanity, love of intrigue, impatience of restraint, love of change, and inability to conceive of and to conform to impersonal laws all drive him to it. Not infrequently, and especially during the last eight troubled years, it has been the gateway to preferment and power, civil and military. The relationship that ladronism, the Katipunan, and the insurrection have borne to each other forms an interesting and curious study, for which the data at hand is still too meager to draw trustworthy conclusions. In a country where the privilege of bearing arms can not generally be granted, he who has one can generally expect the respect of his neighbors. Too often those who suffer heaviest from his cruelty and rapacity most admire and protect him.

There are parts of Bulacan, Rizal, and Cavite where there is reason to believe that a promising girl would prefer life as the stolen mistress of a ladrone to that of wife to a man in the class above her. In these provinces the disintegration and unrest following prolonged war and the wide and unusual distribution of arms incident thereto have aggravated and given an apparently serious turn to a disease that has always been chronic.

But there are well known and specific remedies at hand which make its stamping out only a question of time—the revival of agriculture and commerce; the gradual gathering of arms, ruthless pursuit of those in the field and prompt and impartial application of justice to the survivors, a proper and uniform system of cattle registration, and, above all, the severe punishment of those of the upper or principal class who initiate, connive at, or direct it through motives of private gain or political power, will stop it.

OPERATIONS IN RIZAL.

Several bands operated in Rizal—one in the Morong district under Timeteo Pasay, and several in the broken country to the west of the Mariquina River. Late in February Timeteo seized the presidente, the municipal police, and what arms they had, of Cainta; turned on and defeated a pursuing detachment of constabulary and dispersed—some to the mountainous country about Boso Boso and others to the island of Talim. Assistant Chief Atkinson was sent against him, and as a result of his work the presidente, police, and captured constabulary were turned loose, a part of the lost arms were recovered, and some of the ladrones captured. Those of the leaders who did not flee the province securely hid themselves.

On the 30th of May the band having reassembled and obtained standing and increase by adhesion to the new Katipunan, seized the government quarryman at Binangonan, for the purpose of ransom, and started for the hills. Five lightly armed soldiers met and, seeing that they had an American prisoner, attacked them. In the melee the quarryman escaped, but the soldiers were captured, taken to the hills, and when the pursuit got hot were turned over to another small band, who brutally murdered them.

One hundred constabulary and a company of native scouts gave immediate pursuit. By thoroughly searching the country and by successful application of the cordon system in the Morong Peninsula and the island of Talim, they succeeded in killing a few and capturing many of the common ladrones, and recaptured more guns than it had been believed the band had.

By reason and free discussion with the authorities and principal inhabitants of the towns in that section they were persuaded to not only not countenance but fight ladronism. As a result of this the presidentes, with their municipal police and a few volunteers, took the field, and all the leaders were apprehended, not by the military or constabulary, but by them.

The presidente of Cainta apprehended Timeteo Pasay.

Señor Hilarion Reymundo, whose great influence was given loyally to the Government in this matter, states that Morong is free from ladronism for the first time in his recollection.

Of the bands in western Rizal, one operating south of San Jose has been destroyed and the leader captured. The remnants of the other bands, after a few brushes, joined the Diliman gang, under the professional outlaw Faustino Guillermo. This gang, which takes its name from the barrio of Diliman, a few miles north of Manila, preferred to confine itself to wholesale cattle lifting in the city and its suburbs. The country about there is bare, broken, and little populated. When nothing is doing these ladrones pose as shepherds for certain patrons in the city, who, there is reason to believe, profit much more than the ladrones themselves from their robberies.

Persistent but ineffectual efforts were made by the secret-service department to break up this gang. In the brushes that resulted the detectives met with the heaviest loss, but did succeed in ridding Diliman of and driving the ladrones farther into the country.

Reorganized in the hills about Novaliches, and clothed with apparent respectability by adhesion to the new Katipunan, Guillermo awaited the attack of and repulsed a small detachment under Inspector Geronimo. The next day, July 16, Guillermo himself attacked and dispersed the detachment, which lost 1 killed and 2 captured. The same evening, clad in cañamo trousers and blue shirts, the leader wearing the uniform of a constabulary officer, they presented themselves at the small constabulary post of San Jose, in Bulacan, and seized the unsuspecting members of the detachment, together with their arms. The men, after being marched a few miles into the hills, were released, except one. This private who remained with the band is believed to have been the traitor and to have arranged the coup.

Being busily engaged in Cavite, I intrusted further operations in this locality to Assistant Chief Garwood, who, by drawing a few men from Nueva Ecija and Pampanga and raising a small detachment of volunteers in Bulacan, succeeded in preventing depredations at this time. In a few days large detachments of Bulacan and Rizal constabulary, who had been in Cavite, were marched overland to his assistance, and the further operations have been under the direction of Senior Inspector Keithley, of Rizal.

Twenty days of hard, tedious work, resulting in the capture of a few guns and a few ladrones, followed. August 14, four detachments of constabulary, moving abreast but with wide intervals, were scouting the country north of San Juan del Monte and east of Novaliches. The left detachment of 12 men, under Subinspector Reyes, struck the ladrones in force and was repulsed with loss. The ladrones then entered a barrio in which Subinspector Domingo's detachment of 10 men was scattered, searching the houses; captured Domingo and 3 of his men and drove off the others. At 9 o'clock that night they marched to a deserted house still farther to the east, for rice that had been deposited there for them. Here they found and attacked Inspector Warren, who was resting and feeding his men, a detachment of 1 officer and 21 men. A fierce and at times hand-to-hand fight followed, in which the ladrones were repulsed and driven off. Of the constabulary, Inspector Warren, one sergeant, and three men were wounded, and one corporal and two men killed. Of the ladrones, four were killed and a number not yet ascertained wounded. Cowed by a total loss of eight during the day, the band fled to the hills and then dispersed.

Of the captured constabulary, three, including Inspector Domingo, who in the insurgent army had been commandant of the battalion in which Faustino served as a captain, were allowed to escape.

The slow pursuit, search for hidden arms and disguised criminals has been resumed.

There is grave suspicion that the municipal authorities of San Juan del Monte, from motives of interest, and of Caloocan, from resentment of the strict enforcement of gambling laws, have secretly assisted this gang; not so those at Malabon and at Novaliches, who have arraigned themselves unmistakably on the side of law and order.

Of the new Katipunan, the puppet leaders have been apprehended. It is believed that the real leaders are prominent in Manila.

The organization is recent, thin, and imperfect, and without tangible motive. The new Katipunan is a disease of the Tagalo mind, which breaks out sporadically in spots and without tangible cause. There are traces of it in Zambales, and a light, but widespread, eruption in Tayabas, but it is only in southern Bulacan, Rizal, and Cavite that the disease is serious enough to merit radical treatment.

OPERATIONS IN CAVITE.

Cavite, the mother of ladrones, is a rich province of diversified terrene, but whether it be in the hilly country along the Laguna-Batangas border, the forest land about Palanqui and Paliparan, the rice paddies along the bay, or the plateau that separates the latter from Laguna de Bay, ladronism has existed from the time when the memory of man runneth not to the contrary.

Whether it be that the Cavitenos are less responsible, more vindictive, and less scrupulous than other Tagalos, or that the education received from their leaders makes them more susceptible to vicious cant, sugar-coated with high-sounding words, or that nearness to a metropolitan and not too righteous, seaport has corrupted them, or that the notoriety and sometimes fame and fortune gained by leaders sprung from ladrone loins, or all of these combine to bring it about, the title has been well earned. This refers to the upper or ruling class, not to the gente, who, predisposed to honesty and a quiet life, follow blindly and resignedly the behests of their leaders.

The latter do the advising; the former take the suffering. In the many scraps and petty skirmishes that have occurred between the constabulary and ladrones in Cavite in the last six months, not a real leader has exposed himself, but the killed and wounded among the followers number many.

Last winter they posed as insurrectos, and Malvar, to his discredit, did commission them. Now they pose as patriots of the new Katipunan, but the ruling motive during all this time has been cattle lifting and fondness for the license and ease that result from following it successfully.

Some of the municipal officials are probably their fences and protectors. Montalan makes a raid into Batangas, or Felizardo into Laguna; the stolen cattle are brought to go-betweens, who, with the aid of the municipal officials, change the marks and registrations. The ladrones receive a small reward or price, usually in kind; the go-between sells at the usual price, and the presidente, the secretary, and the consejales, who stand in, pocket the profit.

I know of but one native in the province far-sighted enough to realize that when Laguna and Batangas recover from recent chastisement they will retaliate in kind.

In January five bands, aggregating 500 men, were operating in Cavite. Those of Ciriaco, Batog, and Valentine Montalan were directly under Julian Montalan, who also exercised strong influence over those of Felizardo and Ramos. As a result of negotiations Julian Montalan agreed to surrender, immunity being promised for past offenses, the three bands directly under him and their arms to Governor Trias and Inspector Mair, at Buena Vista, in thirty days. This time was given him on the promise that he would abstain from murder, robbery, or blackmail and spend it in assembling his men and arms. This promise was not kept. The month's immunity was utilized in pillage and blackmail.

February 18, the day agreed, Ciriaco's band, many of Batog's, and a few of Valentine Montalan's surrendered to me at Buena Vista, but the two Montalans, Batog, Felizardo, and Ramos remained out. This result having been foreseen, the constabulary of Cavite had been reenforced from other provinces, and when the truce ended took the field vigorously in small columns. Then followed a campaign, the petty annals of which it would be wearisome to read.

Reenforcements and reliefs from half the provinces of Northern Luzon have been used there from time to time.

For a few days in July 1,200 officers and men were operating in or on the borders of Cavite under my direction.

Small columns, distribution into many garrisons, peopling the bosque with disguised constabulary, and the "cordon" or round-up system have all been tried, with but partial success. The latter method succeeded in that it ringed in all the ladrones, but after a day of petty skirmishes they successfully rushed our line north of Das Marinas.

Batog and most of his followers surrendered unconditionally in March. Shortly afterwards Valentine Montalan, hard pressed by the constabulary, allowed himself to be captured by the volunteers. Most of his followers have been killed, captured, or forced to surrender. Ramos's band, worst punished of any, has given no trouble for months.

It is not worth while to chronicle the many small brushes with and the plans and ruses resorted to, with a view of destroying Felizardo. Some of his followers have been killed, some have been captured, but Felizardo never intentionally risks exposure to fire, and most of the time lives fat and secure, first with one and then another of his many queridas, who dwell in the back barrios of Bacoor and Imus.

The volunteers, which in the beginning amounted to over 200 men but were long since reduced to about 30, have contributed nothing to the cause except expense. Of the guns whose surrender to or capture by them I have been notified from time to time, none have ever materialized at the constabulary storehouse.

Many of the prisoners captured in the first six weeks of hostilities and confined under charge of the volunteers at Buena Vista, not only escaped, but disarmed the guards before doing so.

Notwithstanding the fact that the ladrones have suffered constant loss in men and guns, the aggregates of which are large, there seems little diminution in the number of guns at their disposal, and recently there has been a striking increase in their numerical strength.

I have directed the paying off of and the dispensing with the services of the volunteers.

I can not too earnestly recommend:

First. Quiet but sudden suspension of the writ of habeas corpus, that the municipal presidentes and secretaries of Imus, Das Marinas, and Carmona may be jailed, together with the consejales of the barrios most haunted by ladrones. This discipline might also be found necessary for the presidentes of Silang and Malabon.

Second. If the above does not put a speedy end to the conditions described it is believed that the closing of the ports, in that it would bring reproach on the province, would exercise strong moral effect and inflict no material hardship.

Reconcentration is not deemed necessary.

If they see that we are in earnest and have power to temporarily dethrone thos who sit in high places, the people of the outlying and infected barrios will flock int the towns and visit till the clouds roll by.

THE CHOLERA AND OTHER DISEASES.

What with glanders and then surra among the animals, and then cholera among themselves, these people have, during the past year, tasted much bitterness an sorrow, and in the dealings with them, especially of the tax collectors, they shoul receive merciful consideration.

As soon as the cholera broke out in Manila a strong quarantine guard of constabulary was established from men that could be drawn from different provinces. Afte the cholera leaped into the interior this guard, no longer useful, was done away with but in all the provinces ravaged by the disease the constabulary has rendered promp and efficient aid as guards, nurses, and police. This has been notably the case a Hagonoy and Bacolor, where the work of the constabulary was second only in valu to that of the doctors, and without the former the latter would have been impoten

The deaths from cholera contracted in the line of duty, both by officers and men have been sadly numerous.

OTHER WORK OF THE CONSTABULARY.

In addition to supplying commissaries to Government officials outside of Manila, the constabulary launches carry Government supplies to many ports, and transport all Government supplies overland into Nueva Vizcaya, Benguet, Abra, and Lepanto-Bontoc. It has charge of the longest overland mail route in Luzon—that from Bautista to Bayombong—and of several smaller ones. It takes over, guards, and operates all telephone lines abandoned by the military. It is beginning to increase the telephone and telegraph facilities open to the commercial population.

ROADS.

The work of the supervisors in northern Luzon has not been satisfactory. They have been without a head and are too often too wedded to science to undertake the rough, ready, but prompt, work that is necessary.

Next to carbines, good roads are the strongest weapons the constabulary can have. Where they are agriculture and commerce supplant ladronism and cattle lifting, and they give that facility for moving that would ultimately permit decrease of the constabulary in numbers and cost.

The building of good roads from San Jose, Nueva Ecija, to Dupax, Nueva Vizcaya; from Bagabag, Nueva Vizcaya, to Echague, Isabela; from Iba, Zambales, to O'Donnel, Tarlac; and from San Isidro, Nueva Ecija, to San Fernando, Pampanga, are most important problems that await solution.

RECOMMENDATIONS.

It is recommended that the paper work entailed on the constabulary be diminished in every way possible—specifically, that the quarterly return of constabulary and police be abolished; that the semimonthly telegraphic reports of strength and distribution be dispensed with; that efficiency reports of officers be exacted but once a year; that discharges be not made in duplicate, and that the record of them be kept, not at your but at the headquarters of the different provinces.

That prompt and radical measures be taken to train and obtain native telegraph operators.

That, as I have heard suggested by an eminent jurist, the laws as to conspiracy that operate in the United States be adapted and enforced here. It is believed that for the work that now falls to our lot it would give us a more efficient weapon than the present sedition law.

That a law be enacted prescribing severe penalty for the impersonation of constabulary. The cases are not few where such impersonation has been disastrous to municipal police, and it probably made possible the recent round-up of our post at San Jose.

That a law be enacted intrusting the licensing to bear arms only to the chief of constabulary, under such regulations as his judgment prescribes.

That a law be enacted prescribing severe penalty, involving both fine and imprisonment, for loss of arms intrusted to municipalities, said penalties to be inflicted on the officials immediately accountable and responsible for these stores.

Attached hereto are tables A, showing strength and armament of the first district constabulary; B, showing results of operations in all provinces but Cavite; C, showing results of operations in Cavite. Table B shows only partial results as regards Rizal and Bulacan, where the constant field service, the wounding of one senior inspector, the attack by cholera of another, and the death from cholera of his second in command, have delayed reports.

Respectfully,

D. J. Baker, Jr.,
First Assistant Chief.

Strength and stations occupied July 31, 1902, of the provinces in the first district, including the province of Cavite.

ABRA.

	Inspectors.	Enlisted men.
Bangued	1	30
San Juan	1	14
San Jose	1	15
Villavieja	1	15
Bucay		8
San Quentin		16
	4	98

Authorized enlisted strength, 100.

BATAAN.

Balanga	2	12
Dinalupijan	1	11
Orion	1	8
Orani		5
On detached service in Cavite		37
	4	73

Authorized enlisted strength, 90.

BENGUET.

La Trinidad	1	19
Baguio		16
Sablang	1	12
	2	47

Authorized enlisted strength, 50.

BONTOC.

Bontoc	2	43

Authorized enlisted strength, 80.

BULACAN.

Malolos	3	71
San Miguel	1	24
Angat		25
Maycauyan	1	20
Haganay	1	20
	6	160

Authorized enlisted strength, 162.

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Strength and stations occupied July 31, 1902, of the provinces in the first district, includin the province of Cavite—Continued.

CAGAYAN.

	Inspectors.	Enlisted men.
Tuguegarao	3	5
Aparri	1	4
	4	9

Authorized strength, 162.

ILOCOS NORTE.

Laoag	2	6
Badoc	1	2
Bangui	1	2
Dingras	....	2
	4	13

Authorized enlisted strength, 136.

ILOCOS SUR.

Vigan	4	81
Candon	1	33
Magsingal	1	25
	6	139

Authorized enlisted strength, 162.

ISABELA.

Ilagan	1	35
Nagailan	1	10
Cabagan	1	29
Cordon	....	10
Echague	1	27
	4	111

Authorized enlisted strength, 130.

LEPANTO.

Cervantes	3	82

Authorized enlisted strength, 82.

NUEVA ECIJA.

San Isidro	4	47
San Jose	1	63
Cabanatuan	1	33
Cayapo	1	16
	7	159

Authorized enlisted strength, 162.

NUEVA VIZCAYA.

Bayombong	3	67
Bagabag	1	32
Ibung	0	17
Dupax	1	16
Aritao	0	11
Bambang (quarantine guard)	1	19
	6	162

Authorized enlisted strength, 162.

Strengte and stations occupied July 31, 1902, of the provinces in the first district, including the province of Cavite—Continued.

PAMPANGA.

	Inspectors.	Enlisted men.
Bacolor	2	39
Candaba	1	30
Lubao	0	30
Mabalacat	1	30
	4	129

Authorized enlisted strength, 130.

PANGASINAN.

Dagupan	2	36
Mangatarem	1	14
Binalonan	0	26
San Carlos	1	24
Urdaneta	0	14
Villasis	1	33
Detached service in Cavite	1	50
	6	197

Authorized enlisted strength, 200.

RIZAL.

Pasig	2	20
San Mateo	1	30
San Tolan	0	15
Morong	0	15
Muntinlupa, and on detached service in Cavite	3	69
In Laguna province, under arrest	0	2
	7	181

Authorized enlisted strength, 200.

TARLAC.

Tarlac	2	20
Camiling	0	10
Capas	0	11
Moncada	0	11
Victoria	0	11
On detached service in Cavite	3	98
	5	161

Authorized enlisted strength, 162.

UNION.

San Fernando	2	24
Mamaopacan	1	6
Santo Tomas	0	8
Naguilan	0	7
Rosario	0	11
On detached service	0	18
	3	74

Authorized enlisted strength, 75.

ZAMBALES.

Iba	3	24
Alaminos	1	35
Bani	0	12
Santa Cruz	0	13
Rivera de San Fernando	0	13
San Felipe	0	13
San Marcelino	0	16
Bolinao	0	3
	4	129

Authorized enlisted strength, 162.

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Strength and stations occupied July 31, 1902, of the provinces in the first district, including the province of Cavite—Continued.

CAVITE.

	Inspectors.	Enlisted men.
Bacoor	3	82
Bas Marinas	1	18
Imus	1	22
Buena Vista	0	16
Carmona	1	20
Cavite	0	11
Indan	4	44
	10	213

Authorized enlisted strength, 225.

Total number of—

Inspectors in first district	81
Enlisted men in first district	2,175
Inspectors in Cavite	10
Enlisted men in Cavite	213

Number and kind of arms on hand in provinces of the first district July 31, 1902.

Provinces.	Shotguns.	Fit for service.	Revolvers.	Fit for service.	Rifles.	Fit for service.	Carbines.	Fit for service.
Abra	70	70	55	54			50	50
Bataan			14	14	70	70		
Benguet			20	20	40	25	10	10
Bontoc	20	20	1	1	37	36		
Bulacan	66	66	39	39	116	116		
Cagayan	50	50	54	50	59	59		
Ilocos Norte	102	59	134	134	80	80		
Ilocos Sur	20	20	54	54	50	50	40	40
Isabela	100	100	42	26	59	59	19	19
Lepanto	30	30	1	1	49	44		
Nueva Ecija	68	68	99	99	75	75	81	81
Nueva Vizcaya	150	148	76	76	105	90	50	50
Pampanga	130	130	351	351			100	100
Pangasinan	88	88	75	75	28	28	45	45
Rizal			105	100	173	173		
Tarlac	42	40	75	70	80	75	30	30
Union	38	38	82	72	50	50		
Zambales			30	30			91	91
Totals	974	927	1,307	1,266	1,071	1,030	516	516

Ponies on hand in the provinces of the first district, July 31, 1902.

Provinces.	Number on hand.	Number fit for field service.	Provinces.	Number on hand.	Number fit for field service.
Abra	29	17	Nueva Ecija	7	7
Bataan	0	0	Nueva Vizcaya	8	5
Benguet	7	0	Pampanga	3	3
Bontoc	1	1	Pangasinan	59	59
Bulacan	9	3	Rizal	12	10
Cagayan	38	24	Tarlac	32	30
Ilocos Norte	45	40	Union	68	60
Ilocos Sur	75	64	Zambales	34	4
Isabela	52	20			
Lepanto	17	17	Total	496	364

RESULTS OF OPERATIONS IN THE PROVINCES OF THE FIRST DISTRICT, NOT INCLUDING CAVITE, FROM THE DATE OF THEIR ORGANIZATION TO AUGUST 1, 1902.

Abra.—Aggregate number of expeditions, 18; miles covered, 2,405; arms captured, 1 Krag rifle, 1 Remington rifle; ammunition captured, 500 rounds Krag; stolen animals recovered, 34 horses, 9 head of cattle, 12 carabaos; other property recovered, 100 pieces of timber cut without leave.

Bataan.—Aggregate number of expeditions, 67; miles covered, 1,135; arms captured, 10 Remington rifles, 2 Remington carbines, 1 Remington shotgun, 2 revolvers; ammunition captured, 94 rounds Remington, 8 rounds revolver; stolen animals recovered, 1 carabao.

Benguet.—Aggregate number of expeditions, 82; miles covered, 497; arms captured, none; ammunition captured, none; stolen animals recovered, 2 carabaos.

Bontoc.—Aggregate number of expeditions, 5; miles covered, 230; arms captured, 1 Mauser rifle, 1 Mauser carbine, 1 Remington rifle, 1 Remington carbine, 1 shotgun; ammunition captured, 7 rounds rifle, 18 rounds Mauser.

Bulacan.—Aggregate number of expeditions, 88; miles covered, 3,145; arms captured, 85 Remingtons, 5 Krags, 2 Winchesters, 2 Mausers, 4 shotguns, 18 revolvers; ammunition captured, 277 rounds Remington, 50 rounds Krag, 35 rounds Mauser; stolen animals recovered, 17 carabaos, 1 horse; other property recovered, 30 cords of wood, 10 tenejas of tuba, 49 manops of nipa.

Cagayan.—Aggregate number of expeditions, 4; miles covered, 286; arms captured, 4 Remington rifles; ammunition captured, none; stolen animals recovered, 5 carabaos; other property recovered, 1 watch, chain, and charm.

Ilocos Norte.—Aggregate number of expeditions and special patrols, 123; miles covered, 4,513; arms captured, 2 Krags, 1 Mauser, 5 Remingtons, 10 revolvers, 1 carbine, 4 shotguns; ammunition captured, 48 rounds Krag, 43 rounds Remington, 17 rounds revolver; stolen animals recovered, 5 horses, 1 carabao.

Ilocos Sur.—Aggregate number of expeditions, 11; miles covered, 420; arms captured, 1 Krag carbine, 1 Spencer, 3 Flobert rifles, 1 Springfield shotgun, 3 shotguns, 7 revolvers; ammunition captured, 110 rounds rifle, 41 rounds revolver; stolen animals recovered, 20 native ponies, 11 carabaos.

Isabela.—Aggregate number of expeditions, 231; miles covered, 6,464; arms captured, 1 Springfield rifle (found), 4 Remington rifles, 1 revolver; ammunition recovered, 75 rounds Remington, 20 rounds revolver; stolen animals recovered, 1 carabao, 1 horse; other property recovered, trunk containing jewelry, clothing, etc., valued at $200 Mexican, cargo of rice, and $24 in United States stamps.

Lepanto.—Aggregate number of expeditions, none; arms captured, none; ammunition captured, none; stolen animals recovered, none. This province is blessed with barren annals.

Nueva Ecija.—Aggregate number of expeditions not given; miles covered, 19,568; arms captured, 15 Remington rifles, 1 United States magazine rifle, 1 Mauser, 3 rifles, 1 Colt carbine, 1 Winchester carbine, 1 shotgun, 4 revolvers; ammunition captured, 100 rounds Remington, 30 rounds Mauser; stolen animals recovered, 21 carabaos, 1 horse; other stolen property recovered, postal note for $50, watch, and money.

Nueva Vizcaya.—Aggregate number of expeditions, 21; miles covered, 1,537; arms captured, none; ammunition captured, none; stolen animals recovered, 5 carabaos, 2 American horses, 1 native pony; other property recovered, 150 pounds rice.

Pampanga.—Aggregate number of expeditions—have had no special expeditions, nothing but daily patrols, averaging about 15 miles per day; arms captured, 12 Remington rifles, 5 Mausers, 2 Krags, 1 Japanese rifle, 1 Springfield rifle, 21 revolvers; ammunition captured, 440 rounds rifle, 187 rounds revolver; stolen animals recovered, 43 carabaos, 3 ponies.

Pangasinan.—Aggregate number of expeditions, 60; miles covered, 2,200; arms captured, 3 rifles, 9 revolvers, 4 cannon; ammunition captured, 98 rounds Remington, 65 rounds Mauser, 45 rounds revolver, 6 cases 1-pound rapid-fire shells; stolen animals recovered, 6 horses, 17 carabaos; other property recovered, 1 insurgent seal, insurgent papers and books, 48 pesos illegal subscriptions, machinery Manila and Dagupan Railway, books and papers belonging to provincial treasurer, stolen goods, 28 pesos, 1 carromata and 2 horses, cloth valued at 300 pesos, diamonds and gold coin valued at 2,000 pesos.

Rizal.—Number of expeditions, 95; miles covered, 1,500; arms captured, 42 Remington rifles, 20 shotguns, 3 Mausers, 8 revolvers, 1 Mannlicher rifle, 1 Krag, 3 shotguns; ammunition captured, 281 rounds Remington, 82 rounds Mauser, 5 rounds revolver, 200 rounds mixed Remington, Mauser, and revolver; stolen animals recovered, 3 carabaos, 3 horses; other property recovered, 1 carromata and harness.

Tarlac.—Aggregate number of expeditions, 169; miles covered, 6,292; arms captured, 13 Remington rifles, 1 Mauser, 12 revolvers, 8 shotguns; ammunition captured, 111 rounds rifle, 21 rounds revolver; stolen animals recovered, 11 horses, 93 carabaos; other property recovered, $59 cash, 1 valise containing valuable papers, the property of Captain Barth, Twelfth Infantry, 2 cases surgical instruments, stolen from hospital at Caloocan.

Union.—Aggregate number of expeditions, none; arms captured, none; other property recovered, 1 watch, 1 pair boots, 3 revolvers.

Zambales.—Aggregate number of expeditions, 60; miles covered, 2,288; arms captured, 10 rifles; 11 revolvers, 5 shotguns; ammunition captured, 147 rounds rifle, 10 rounds revolver; stolen animals recovered, 25 horses, 15 carabaos.

Total number of expeditions, 1,023; total number of miles covered, 52,060; total number of arms captured, 251 rifles, 49 shotguns, 10 revolvers, 4 cannon; total number of rounds of ammunition captured, 2,811 rifle, 354 revolver, 6 cases 1-pound rapid-fire shells; total number of stolen animals recovered, 247 carabaos, 12 head of cattle, 113 horses.

List of officers and men surrendered and captured in the province of Cavite from February 18, 1902, to August 1, 1902.

1902.	Surrendered.	Captured.	Killed.
February 18	Commandante Ciriaco, 2 captains, 5 lieutenants, and 41 men. Captain Cornelio, Batog's battalion, 1 lieutenant, and 13 men.		
February 19	4 men, Agaton's command		
February 22			6 men, Ramo's battalion.
February 23	Commandante Batog, 8 men		
February 24		4 men, Felizardo's battalion	
Do			3 men, Felizardo's battalion.
Do			1 man, Ramo's battalion.
February 25			8 men, Ramo's battalion.
February 27	Captain Apolanco, 20 men, all of Agaton's command. Captain Camerino, 2 lieutenants, 17 men, all of Batog's command.		
February 28	2 men, Agaton's command		
March 1		Commandante Valentine Montalan.	
Do	Capt. S. Anacan, of Julian Montalan's command.		
March 3		6 men, Mendoza's company, Batog's battalion.	
March 4		3 men, Felizardo's battalion	4 men, Ramo's battalion.
March 5	1 man, Montalan's battalion	2 men, battalion not given; 1 man, Felizardo's battalion.	
March 6	10 men, Montalan's battalion		
March 7	3 men, Batog's battalion		
March 8	2 men		
March 10	1 man, Felizardo's battalion		
March 13	5 men, battalion not known	1 man, battalion not given.	
March 19		5 men, battalion not given.	
March 19	Commandante Agaton, 1 captain, 7 men.	1 armore battalion not given.	1, battalion not given.
March 21		1 captain	
March 22	1 lieutenant, 1 man, Montalan's battalion.	1 lieutenant, Montalan's battalion.	man.
March 25		1 lieutenant, Felizardo's battalion.	
March 27	1 man, Cameron's company		
March 31	1 captain, 1 lieutenant, Felizardo's battalion.		
April 2	man, Montalan's battalion	man, Montalan's battalion.	
April 7	4 men, Montalan's battalion		
April 8			1 man, Ramo's battalion.
April 18	1 lieutenant and 10 men, Ramo's battalion.		
April 20		1 officer, Felizardo's battalion.	
April 24		2 men, battalion not given; 1 man, battalion not given.	
April 28	Captain Jermais, Felizardo's battalion.		
April 30	1 captain, Felizardo's battalion; 5 men, Ramo's battalion.	Captain Felix and 5 men, 2 collectors and 1 man, Felizardo's battallion; 4 men, J. Ramo's battalion.	
May 7	1 lieutenant, 3 men, Felizardo's battalion.		
May 12		Adjutant's Montalan's battalion.	
May 21		2 men, battalion not given.	

List of officers and men surrendered and captured in the province of Cavite from February 18, 1902, to August 1, 1902—Continued.

1902.	Surrendered.	Captured.	Killed.
May 30		1 man, battalion not given	1 man, battalion not given.
June 20			1 man, Bernardo.
June 25		1 man	1 man.
June 30	1 lieutenant, 1 man, Felizardo's battalion.		
July 15		3 men, Montalan's battalion.	
July 23		3 men, Felizardo's battalion.	
July 24			3 men, Montalan's battalion.
July 25		1 man, Felizardo's battalion.	
July 29		1 lieutenant, 6 men, Ramo's battalion.	
July 31	1 man, Felizardo's battalion	4 men, Felizardo's battalion.	Captain Lucio Camagan.

Total surrendered: Officers, 26; men, 161.
Total captured: Officers, 8; men, 60.
Total killed: Officer, 1; men, 31.

Arms surrendered and captured in the province of Cavite from February 18, 1902, to July 31, 1902.

1902.	Rifles surrendered.	Rifles captured.	Revolvers surrendered.	Revolvers captured.
Feb. 18	19		8	
18	1			
18	1		5	
19	3			
22		2	1	
23	3		1	
24		1		
24		7		
25		3		
27	10		1	
27	10		1	
28	2	1		
Mar. 1	1			1
3	6	5		
4		2		1
5	6	5		2
6	5	3	1	
7	2		1	
8	2		1	
10				1
12		3		3
13		1	3	1
15	1			
18		2		4
19	5		4	2
21				1
22	3	9	2	1
25			1	
27		4		3
31	1		1	1
Apr. 1	2	3	2	3
2	1			
3		1		
5	12	5		4
7	2			2
8			1	
18	3		2	
22	1			
28			1	1
30	2			
May 7	3			1
8	1		1	1
12				2
18		1		1
18	10	1	2	
20				1

Arms surrendered and captured in the province of Cavite from February 18, 1902, to July 31, 1902—Continued.

1902.	Rifles surrendered.	Rifles captured.	Revolvers surrendered.	Revolvers captured.
May 21				3
25				3
23			2	
30			1	3
June 3				1
6	1	2		
7	2			
12		1		2
17				1
20	1			
21		1		2
July 5		2		2
6	3		2	
15		3		
23		1		
24		2		
25		1		
30		1		
31		1		
Total	119	74	45	54

REPORT OF THE ORGANIZATION, OPERATIONS, AND CONDITIONS IN THE PROVINCES COMPRISING THE SECOND DISTRICT, PHILIPPINE CONSTABULARY. FROM AUGUST 1, 1901, TO JULY 31, 1902.

THE DISTRICT.

The second constabulary district embraces the whole of southern Luzon and a part of the Visayan group of islands. It is comprised of the provinces of Albay, Batangas, Camarines, Cavite, Laguna, Marinduque, Masbate, Paragua, Romblon, Sorsogon, Tayabas, and includes the islands of Mindoro, Marinduque, Masbate, Burias, Ticao, Romblon, Sibuyan, Tablas, Cuyo, Calamianes, Paragua, and Catanduanes.

The total population of the provinces comprising the second constabulary district is about 1,332,619. The total number of constabulary at present organized in the district is 1,519 (including Cavite).

TOPOGRAPHY.

The country is generally mountainous, there being a general range extending down from northern Luzon to the extreme southern coast, following the contour of the island, the most mountainous portions being through Tayabas and Camarines Norte.

There are three active volcanoes in southern Luzon, viz, Taal in Batangas, Mayon in Albay, and Bulusan in Sorsogon. The latter has within the last two months become active, after having been dormant for a great many years. The volcano Mayon, in Albay, is one of the largest and most perfect cones in existence. It also has a very disastrous record, having in different eruptions destroyed the towns of Cagsaua, Badiao, Malinao, and Libog, burying one town (Cagsaua, 1814) completely and killing over 2,200 persons. Some of the best hemp in the Philippines is grown upon the side of this volcano. All the islands are mountainous in the interior.

There are numerous rivers, only one, however, the Bicol, in Ambos Camarines, being navigable by light-draft seagoing ships.

The large lakes are Taal, or Bombon, in Batangas, Bato and Buhi in Ambos Camarines, and Naujan in Mindoro.

Between the ramifications of the cordilleras or mountain chains is found very pretty stretches of rolling land, interspersed here and there with rivers. The land, whether level, rolling, or extremely hilly and mountainous, is very rich.

THE PEOPLE.

The inhabitants are mostly Tagalog, Bicol, and Visayan, although Moros inhabit the southern portion of Paragua. There is an upper class, few, comparatively, in number, which is the ruling class, the members of which are extensive land owners, and in a great many instances are educated and accomplished and have traveled abroad. There is practically no middle class. The masses are the poor working people, who are uneducated and are completely under the control of the class first mentioned.

The Tagalogs inhabit exclusively the provinces of Cavite, Batangas, Laguna, Tayabas, Marinduque, and a part of the island of Mindoro. They are the shrewdest, most inconstant, dissatisfied, and troublesome of all the tribes in the second district. They make good soldiers, however, and once well imbued with the American idea of straightforwardness and truthfulness, they become very trustworthy. They were the leading element in the recent insurrection, and are at present the leading element in ladronism, the provinces inhabited by them being the worst affected at present. A great number of Tagalogs are besprinkled throughout the other provinces, some in business and a great many with no visible means of support, and they are liked and hated accordingly by the people of the other tribes among whom they have come to live.

The Bicol is the next strongest tribe in the district. They inhabit the provinces of Ambos Camarines, Albay, Sorsogon, and the large island of Catanduanes, and are a peace-loving, industrious, contented, yet brave tribe, and have a generally greatly pronounced dislike for their brother, the Tagalog, at whose door they attribute all their losses and suffering during the recent insurrection. This feeling is intensified by the fact that the insurgent generals in the Bicol country were all Tagalogs, sent down from the north, and who, with hardly an exception, taxed and extorted money from the provincial natives in a very scandalous manner. Their country was rich, and they did not object to taxation, although they were not well represented, but did object when they saw that most of their money did not find its way into the general treasury, but rather into the pockets of some of the generals, whose names are held by the second district chief. The Bicol people, in general, are very much satisfied with American rule, claiming they have more rights and privileges now than they ever before dreamed of possessing.

The Visayans occupy the provinces of Masbate, Romblon, and Paragua (Cuyo, Calamianes, and north Paragua). They are a very similar people to the Bicol, and their language resembles the Bicol. They are better workers than the Tagalog or even their brother, the Bicol, and the second district chief is glad to state that there is no large band of ladrones nor trouble of serious nature in any of the Visayan Provinces.

The Moros who occupy the southern portion of the island of Paragua are very ordinary Moros who embrace the Mohammedan religion, but they are of a much less turbulent class than their brothers in the south, and they do not molest the other inhabitants of different religious belief on the island.

There are several wild tribes in the second district, the most notable of which are the Negritos of Mount Isarog and Iriga, in Ambos Camarines; the Manguianes of Mindoro, in the Mount Halcon district, and the Tagbanoas, who live in the settlements of Ihuahig, Inagahuan, Irahaun, Mailigan, Aburlan, Apurahaun, and Napsahan, in the island of Paragua. The last-named tribe is probably more semicivilized than the other two.

RESOURCES AND INDUSTRY.

Southern Luzon, as well as most of the islands included in the second district, is extremely rich in natural resources. Vegetation is extraordinarily rich and abundant. Excellent timber for building and other purposes is found in every province, and in some provinces it is of unknown wealth, Mindoro especially being very rich in timber.

Fruits of almost every tropical species abound. There are over 50 different species. The cocoanut tree is the most important of the family of palms, and from it alone the native obtains so many things of daily use that he could almost live without everything else. Coffee is grown to a great extent in Batangas. Rice, tobacco, cocoa, indigo, sugar cane, pineapples, etc., are grown extensively in different parts.

Hemp, however, is the real wealth of southern Luzon and of the Philippines. Nowhere is it grown and nowhere does it thrive more prolific than in southern Luzon and the Visayan Islands. Albay has the largest output of hemp, although the finest fiber comes from the island of Marinduque. It is grown to a great extent, however, in all the southernmost provinces and islands. The raising of cattle on the islands of Masbate, Ticao, and Burias has received a setback through inroads made by rinderpest, and this industry has been somewhat abandoned.

Large deposits of coal have been found in southern Camarines, the island of Bataan, Albay, and in Sorsogon. It also exists in Mindoro to a large extent. Iron is found in North Camarines and copper in Tayabas, Ambos Camarines, and Albay. The most notable gold mines to be found in the Philippines are at the towns of Mambulao, Paracali, and Sabog, in North Camarines, where lead is also found. Great deposits of fine marble are found on the island of Romblon.

EPIDEMICS.

There have been several epidemics, which have destroyed horses, cattle, etc., during the past year, the most serious of which were the rinderpest, which destroyed the cattle, and the surra, which attacked the horses. The islands of Masbate, Ticao, and Burias were almost entirely given over to the raising of cattle, but the rinderpest has entirely denuded them. It also worked great havoc in southern Luzon, where it killed nearly all the carabaos, as well as the wild deer in the mountains. Horse raising formerly flourished in the provinces of Batangas and Ambos Camarines, but the surra stripped these provinces to such an extent that it has been stated hardly 40 native ponies are left in the whole province of Ambos Camarines.

The dreaded cholera made its appearance in all provinces of the second district, excepting only Albay, Sorsogon, Romblon, and Paragua. It was kept out of Albay by the untiring efforts of Governor Betts, who instituted a strict quarantine and maintained a shotgun cordon between Albay and Ambos Camarines, where the disease had gained a strong foothold. At present time the disease is speedily diminishing and the cases do not appear to be of such a malignant type as at first. It is thought that within another month it will entirely disappear.

FUTURE PROSPECTS.

The future outlook for southern Luzon and the adjacent islands comprising the second district is very promising. The people of most of the provinces have settled down to peaceful pursuits and enjoy the protection, advantages, and just government rendered them by the existing régime. Also the people of the more turbulent and unruly provinces are beginning to see the futility of eternal petty strife among themselves and with the constituted government and are beginning to follow the example displayed by their more contented brothers.

In some of the provinces where the political situation has been somewhat doubtful up to the present time, there has arisen dissension among the discontented factions themselves, caused by jealousy and rivalry, and when their attentions have been diverted to each other they have neglected somewhat their machinations against the existing government, the fairness of which has continually been growing more and more apparent, whether opposed or not, during the past short year.

The second district chief believes he is safe in the prediction that there never again can be another general insurrection against the authority of the United States Government in the Philippines Petty chiefs will, without doubt, at divers times and in different localities during the next two years or more, start small insurrections of their own, but a concerted movement of a serious nature can not be made. The fact alone that the government has a great abundance of friends among the natives who would strongly oppose this, precludes its culmination. Also the people of different localities have dissensions among themselves which have been made more bitter during the late insurrection.

The commercial and agricultural interests will reach a state during the next two years never dreamed of by the Filipino people; some of them are beginning to realize this.

There should be a first-class railroad running from Manila down into the hemp district as far as Sorsogon. This would give a great impetus to the hemp industry, in which lies the greatest source of wealth and revenue of the Philippine Islands. It would also be a great factor in the civilization of the people and would result a magnificent investment for the corporation which places it.

The outlook for the constabulary is especially flattering and gratifying. In the short time which has passed since the passage of the law authorizing the organization of the constabulary, forces have been organized in every province of the second district and have taken over the work from the military of keeping these provinces in a state of pacification. This proved a hard task soon after insurrection had ceased in some of the more turbulent sections, but the constabulary force, although new and untrained in the extreme and recruited greatly from ex-insurgents themselves, met those conditions with such efficiency and vim as to even excel previous expectations and entirely shatter the doubts of any who had previously looked askance at the idea of so quickly organizing a large native military police to whom would be intrusted the peace of the islands while yet armed insurrection was in existance.

Organized with a view to supplying the needs of a semimilitary force that could be at instant call of the civil authorities, it has, during the short year just passed, demonstrated its efficiency under very trying conditions to the greatest satisfaction of its organizers and reflecting the greatest of credit on its chief, under whose very able direction this had been possible. It has passed the probationary period with great honor and credit, and has as well entered on a career of incalculable usefulness.

THE CONSTABULARY.

The organization of the constabularly in the second district was begun early in the month of August. The second district was defined in Orders No. 49, headquarters Philippine constabularly, October 14, 1901, being constituted of the provinces of Albay, Ambos Camarines, Cavite Marinduque, Masbate, Romblon, Sorsogon, and Tayabas. This order also assigned the third assistant chief, Maj. Wallace C. Taylor, to command the district. Later in the month the provinces of Batangas, Laguna, and Paragua were admitted into the second district.

Organization progressed very rapidly under the assistant chief, Taylor, who continued to command the district until March 1, 1902, when he was relieved by the fourth assistant chief, Jesse S. Garwood, who is at present in command.

The constabulary from the very start were compelled to take the field before they were uniformed or their equipment complete, and it was gratifying to see how cheerfully the men did their duty under very adverse circumstances.

The different campaigns are given under the headings of the provinces in which they occurred. The most important of these was the campaign in Sorsogon against the fanatic Colache and his followers, which resulted in the total dismemberment of their organization and the capture of Colache himself and nearly all his men. Great credit for the successful end of this campaign is due the governor of Sorsogon, Señor Bernardino Monreal, who exerted his every effort in the aid of Senior Inspector Nevill of the constabulary, who, with this aid, put an end to Colache's rebellion in a very short campaign. This goes to show what can be accomplished in any province having a native governor who gives his earnest support to law and order in an emergency.

The organization and subsequent events in the different provinces during the year is given below by provinces:

ALBAY.

[Including island Catanduanes.]

Organized per act 122, April 26, 1901; governor, A. U. Betts; inhabitants, Bicols; area, about 1,590 square miles; population, about 183,326; towns, 29; barrios, 200; capital, Albay.

Constabulary garrisons.

Station.	Commanded by—	Strength.
Albay	Inspector Collett (S. I.)	32
Virac	Inspector Fletcher	20
Pandan	Sergeant	11
Guinobatan	Inspector Nery	38
Ligao	Sergeant	16
Polangui	Inspector Jahn	24
Tabaco	Inspector Masankai	23
Tivi	Sergeant	15
Legaspi	do	4
Bantayan	Corporal	10

Total in province: Inspectors, 6; enlisted men, 193. Authorized enlisted strength, 162.

Expeditions, 119; engagements, 8; ladrones killed, 9; ladrones captured, 65; miles traveled, 4,895; arms captured, 5 revolvers, 12 war bolos, 5 wooden guns, 1 brass cannon, 1 bamboo cannon, 500 rounds Remington ammunition, 100 rounds Krag, 40 rounds Mauser, 6 rounds revolver; stolen animals recovered, 1 horse, 2 carabaos; other property recovered, 10 blankets, $500 Mexican; stolen clothing, 3 insurgent uniforms.

Organization of the constabulary in this province was begun August 19, 1901, when First-class Inspector Jesse S. Garwood was ordered to that province, accompanied by Third-class Inspectors Harrison O. Fletcher and Robert J. Jahn. Later, Fourth-class Inspector Saturnino Nery was appointed and assigned to that province.

The province was immediately divided into four subdistricts by Inspector Garwood, who took command of the first subdistrict himself, and assigned Inspectors Fletcher, Jahn, and Nery to command the second, third, and fourth subdistricts, respectively.

This province is one of the most peaceful in the district. The people, as a rule, are friendly, and are disposed to help the constabulary whenever possible.

The bands of Saria and Ola represent the ladrone element, but they have been chased by the constabulary to such an extent that they are not committing any depredations.

In the month of February of this year six members of the constabulary of this province, stationed at Polangui, while out on patrol, went over the border into the province of Ambos Camarines, and in the barrio of San Vincente, under guise of searching for ladrones, took jewelry and money from the inhabitants. They were promptly arrested by Inspector Jahn, who turned them over for trial in Camarines Sur. They were sentenced by Judge Carson to serve from one to ten years.

A circular order, setting forth the above offense and the sentences, was promulgated from these headquarters, translated into Spanish, and duplicate copies mailed to each senior inspector, who was instructed to have the order translated into the dialect spoken in his region, and read to each separate detachment of constabulary in his province at three consecutive roll calls. In this manner all members of the constabulary in the second district have been made acquainted with the consequences of this abuse committed by its members, and it has undoubtedly had the effect desired.

Several officers who had surrendered with General Belarmino, afterwards took to the hills again, among them Commandantes Toledo, Ola, Saculo, Bidar, Espada. The first, Toledo, and the last two named, Bidar and Espada, have been recaptured, together with Mariano Guriba, an ex-captain. These are awaiting trial by the court of first instance.

AMBOS CAMARINES.

Organized per act 123, April 27, 1901; governor, James Ross, March 3, 1902; inhabitants, Bicols and Negritos; area, about 3,092 square miles; population, about 209,000; towns, 44; barrios, 180; capital, Nueva Caceres.

Constabulary garrisons.

Station.	Commanded by—	Strength.
Nueva Caceres	Inspector Armstrong	33
Palestina	Corporal	7
Pili	do	10
Pamplona	Sergeant	13
Indan	Inspector Scheutz	16
Labo	Corporal	9
Goa	Sergeant	17
Iriga	do	10
Buhi	Corporal	10
Ragay	Inspector Buenaventura	20

Total in province: Inspectors, 4; enlisted men, 145. Authorized enlisted strength, 162.

Expeditions and patrols, 71; engagements, 6; ladrones killed, 7; ladrones captured, 23; miles covered, 1,795; arms captured, 2 Remington rifles, 6 muzzle-loading muskets, 1 Mauser rifle, 5 revolvers; ammunition captured, 37 rounds of Remington, 1½ cans gunpowder; stolen animals recovered, 5 horses, 6 carabaos; other property recovered, 2 gold watches, 1 gold chain, 1 gold pendant, 1 diamond brooch, 273 Remington empty shells, 91 Mauser empty shells, 35 cabanos rice.

Organization of the constabulary in this province was begun on September 1, 1901, by First-Class Inspector E. S. Luthi. He was succeeded October 3 by First-Class Inspector Samuel D. Crawford, who was transferred to Batangas September 4, 1901, and Second-Class Inspector George K. Armstrong, who was promoted to first-class inspector and assigned to the command of that province. He is still senior inspector and has brought the constabulary of his province to an excellent state of efficiency.

The natives of Ambos Camarines had the misfortune to lose 4,000 carabaos, over 1,000 head of cattle, and nearly all their horses by pest. This was a hard blow to them, as Camarines is mostly devoted to the raising of rice, and the people of necessity depend upon their cattle for tilling the soil.

The peacefulness of the inhabitants has made it possible for the senior inspector to devote considerable time to drill, etc., and his men have become very proficient. When the constabulary started organizing in this province the military occupied 17 towns. At present they occupy but 2.

The most dissatisfied element in the province has been the non-Christian tribe of Negritos of Mount Isarog and Iriga districts. A conference, however, has been brought with their headmen, and arrangements made whereby they have agreed to present themselves to the governor with a view to bettering their conditions. The chief of the tribe, Andong, lives on Mount Iriga, and will probably be made the first presidente of the new pueblo which it is contemplated giving to the Negritos.

The chief has promised to cooperate with the authorities and to be responsible for the good behavior of his tribe. These Negritos were always considered outlaws by the Spanish authorities, who made repeated raids upon them, carrying away their children, etc., to serve as vassals.

The future of the province is thought to be exceptionally bright, as it is very rich in natural resources and many American investors are directing their attention there.

BATANGAS.

Organized, per act 126, May 21, 1901; governor, Simon Luz, June 23, 1902; inhabitants, Tagalog; area, about 1,154 square miles; population, about 212,192; towns, 22; barrios, 520; capital, Batangas.

Constabulary garrisons.

Station.	Commanded by—	Strength.
Taal	Inspector Crawford	153

Total in province: Inspectors, 4; enlisted men, 153. Authorized enlisted strength, 162. Expeditions, 2; miles covered, 158.

This province has been found in the past to be one of the most turbulent and unruly of any of the provinces of this district. It is hoped, as present conditions indicate, that a complete change for the better has come. Civil government was first established May 2, 1901, but on June 17, 1901, after only having been a little over two months under civil rule, it was reverted to military government, owing to the continued and persistent turbulence of the inhabitants, who did not seem to desire or appreciate law and order.

On June 23 last Batangas was again turned over to the civil government, the military under General Bell having administered a severe lesson to the insurrectionary element and eliminated from the province all semblance of armed insurrection and ladronism.

During the military operations, First-Class Inspector Samuel D. Crawford, Inspectors Charles C. Richmond, Frank S. McNeill, and a corps of secret service men were on special duty with the military.

Upon the return of the province to civil rule, Inspector Crawford began organizing the constabulary, which is now doing excellent service against the bands of ladrones who slip back and forth over the border of Cavite, Laguna, and Tayabas.

During the recent cholera epidemic which attacked the province very severely the constabulary contracted the disease in their quarters, but through the efforts of the senior inspector the disease was overcome. Not, however, until it had caused the death of 12 of the constabulary men. Inspector Crawford deserves great credit for the efficient manner in which, by sanitary methods and personal supervision, he overcame the disease, remaining personally with his men until the last vestige was stamped out.

At the present time there is no apparent disaffection in Batangas. The following is quoted from one of the reports of the senior inspector:

"The activity in house building, repair of hedges, fences, and other environments, the extensive cultivation and planting of fields and gardens, the general industry throughout the province, the renewal of commercial pursuits, the harmonious administration of civil affairs in the pueblos and barrios would all imply to the stranger that the civil government had never been suspended in this province. Principales and property holders, who, a few months since were sitting idly awaiting the tide of affairs, or who were secretly engaged in opposition to the American Government, are all now actively engaged in hunting for their old workmen, or are seeking new ones to till their long-neglected estates, or for carpenters to build new houses or repair their old ones.

"From the expressions from the leading minds among the Filipinos it is evident that there is a comprehensive appreciation of the character and intentions of the Americans among the natives. It may be admitted in sincerity that the true character of the Filipino has not been fully understood in the past. Their many finer qualities have been obscured by insurrectory unrest, and as the latter disappears the best traits stand out in agreeable contrast with former relations. It is daily in evidence in the province that old-time distrust and hatred are disappearing, and in their place sentiments of confidence and respect are daily manifesting themselves. An increasing knowledge of the steadfastness of the American policy in this province has settled the certainty in the minds of the native of the tenure of the United States Government here.

"The part taken by the army in the establishment of the civil affairs of the various pueblos and barrios will certainly be remembered with gratitude by the thousands who have been so greatly benefited and protected. Every power of authority and of nature and excellent judgment has been exerted by the military authorities to develop good government and fair dealings between native officials and the people. The natives in this province have—and for the first time—an idea of official honesty as they see it exemplified in the every act of the United States army officer who has had close relations with the people."

The most active ladrone organizations exist in the sections adjacent to the Cavite line, in the Lake Taal country, in the vicinity of Looc, and Tumalin in the west, and in the San Juan and Lobo districts. More arms have been captured and surrendered than were originally charged to the insurgents of the province.

CAVITE.

Organized per act 138, June 11, 1901; governor, Mariano Trias, March 4, 1902 inhabitants, Tagalog; area, about 460 square miles; population, about 142,172; towns, 22; barrios, 108; capital, Bacoor.

Constabulary garrisons.

Station.	Commanded by—	Strength.
Bacoor	Inspector Knauber	82
Das Marinas	Inspector Green	18
Imus	Inspector Hill	22
Buena Vista	Sergeant	16
Carmona	Inspector Lopez	20
Cavite	Corporal	11
Indan	Inspector Carter	44

Total in province: Inspectors, 10; enlisted men, 213. Authorized enlisted strength, 225.

Expeditions, 2; miles covered, 727; engagements, 12; outlaws killed, 39; outlaws wounded, 54; outlaws captured, 36. Arms captured—rifles, 220; revolvers, 98; shotguns, 9. Ammunition captured, 800 rounds rifle; 350 rounds revolver. Stores captured, 1,000 cabanos rice. Stolen animals recovered, 40 caraboas, 10 horses.

First-class Inspector Thomas I. Mair organized the constabulary in this province, and was senior inspector until he was appointed governor of the new province of Leponto-Bontoc when Inspector Knauber was assigned as senior inspector.

In the month of January, while Assistant Chief Taylor was still in command of the second district, and during his temporary absence in Tayabas, a peculiar state of affairs developed in Cavite and Captain Baker took charge of operations. Conditions have greatly improved; volunteers have been organized by Governor Trias to aid the constabulary. A full report will be made by Captain Baker, who is still in charge.

LAGUNA.

Organized per act 424, July 1, 1902; governor, Juan Cailles; inhabitants, Tagalog; area about 684 square miles; population about 177,200; towns, 28; barrios, 495; capital, Santa Cruz.

Constabulary garrisons.

Station.	Commanded by—	Strength.
Santa Cruz	Inspector Sorenson	48
San Pablo		24

Total in province, inspectors, 4; enlisted men, 72. Authorized enlisted strength, 162.

Expeditions, 8; miles covered, 300; arms captured, 23 Remingtons, 11 Mausers, 27 shotguns, 11 revolvers; ammunition captured, 30 rounds Remington, 18 rounds revolver.

Organization of the constabulary in the province of Laguna was not started until June 9, 1902, when Second-class Inspector August O. Sorenson was assigned to this duty. Inspector Sorenson and a number of secret service men had, however, been on duty with the military in the province for some months previous, and had rendered very excellent service.

Present conditions in Laguna are good. There is no dissatisfied element in this province, only small bands of ladrones representing the criminal class who did not surrender for fear of being held for crimes previously committed. Although one of the last provinces to come under the civil government it is hoped that by cooperation of the governor with the constabulary, Laguna will now be kept free from serious disturbances.

MARINDUQUE.

[Including the Island of Mindoro.]

Organized per act 125, May 1, 1901; governor, Ricardo Paras, March 3, 1902; inhabitants, Tagalog; area, about 288 square miles (Marinduque proper); area of Mindoro, about 4,050 square miles; population, about 66,000; towns, 6; barrios, 96; capital, Boac.

Constabulary garrisons.

Station.	Commanded by—	Strength.
Boac	Inspector Griffiths	32
Torrijos	Corporal	9
Gasan	Sergeant	12
Santa Cruz	do	14

Total in province: Inspectors, 2; enlisted men, 67. Authorized strength, 80.

Expeditions and patrols, 57; miles covered, 1,695; engagements, 1; outlaws killed, 1; captured, 34; arms captured, 34 Remington rifles, 1 Mauser rifle, 12 Krag rifles, 1 repeating rifle, 7 bronze cannon, 2 swords, 2 revolvers, 11 bayonets. Ammunition captured: 829 rounds rifle, 27 rounds revolver, 130 rounds cannon. Other property recovered, 11 web belts, 1 field cornet.

The organization of the constabulary of Marinduque was begun by Second-class Inspector Thomas Embry, September 25, 1901. He was relieved October 9, by Third-class Inspector John B. Schuetz, who was in turn relieved by Second-class Inspector B. L. Smith, on December 31, 1901. Inspector Smith was assigned to the province of Tayabas in April and was relieved as senior inspector of Marinduque by Third-class Inspector H. J. Brown. On June 30, First-class Inspector Richard H. Griffith, the present senior inspector, took charge.

In the month of January, 1902, 25 rifles were found hidden away in the hills and guarded by two ex-insurgent soldiers. These rifles were found by Inspector Schuetz. Inspector Smith made a thorough investigation which resulted in the arrest of the clerk of the court of first instance, an ex-colonel of insurgents named Maximo Abad, he being implicated the deepest, and Pedro Lardizabal, an ex-major of insurgents, Ramon Revilla, Victor Revilla, and Estanislao Perñia, ex-insurgent soldiers, and the presidente of Torrijos, Lucio Quinto. Inspector Smith had a very difficult time in getting evidence aginst these men, as all the natives seemed to be impeding every effort of his, and the justice of the peace preferred counter charges against him. However, all of those arrested were convicted by the court of first instance and received sentences of from one to ten years for sedition.

Conditions at present are very good in Marinduque and will probably remain so. The military have been entirely withdrawn from the island.

MASBATE.

[Including the islands of Ticao and Burias.]

Organized per act 105, March 18, 1901; governor, Bonifacio Serrano; inhabitants, Visayans; area, about 511 square miles; population, about 28,061; towns, 10; barrios, 15; capital, Masbate.

Constabulary garrisons.

Stations.	Commanded by—	Strength.
Masbate	Inspector Grossman	22
Naro	Corporal	6
Palanas	Sergeant	14
Cataingan	do	22
D. S. Leyte	Inspector Hester	39

Total in province: Inspectors, 3; enlisted men, 103.

Expeditions and patrols, 94; miles covered, 3,038; outlaws killed, 3; outlaws wounded 2; captured, 16; arms captured, none; ammunition captured, none; other property recovered, 1 rowboat.

The first senior inspector, W. P. Barber, arrived in Masbate September 1, 1901. He was relieved by Second-class Inspector Otta Marshall, October 15, 1901. Inspector Marshall was relieved as senior inspector April 8, 1902, by Second-class Inspector Christian Crossman.

Conditions in this province are very good. The people are very friendly and law-abiding. Melchore de la Cruz and a following of nine men, all fugitives from justice, unarmed, are in hiding in the mountains of Palanas. They are not active, except at intervals, when they kill a carabao for food, but spend most of their time evading the authorities. The crime for which these men are hiding was the murder, in a most revolting manner, of a Spanish family living in the barrio of Naro of the town of Palanas, in August, 1900. Since that date the military captured, tried by military commission, and hung four of the gang. One was killed by the constabulary while resisting arrest, and two more, who were captured by the constabulary, have been tried and sentenced to be hanged, and at present are awaiting execution of sentence.

Thirty-nine men under Inspector Hester served with great credit in Leyte during the recent campaign there under Major Taylor.

The military have been entirely withdrawn from Masbate.

PARAGUA.

[Including the islands of Calamianes and Cuyo.]

Organized per act 422, June 23, 1902; governor, Captain Phillips, Tenth United States Infantry; inhabitants, Visayans and Moros; area, about 5,630 square miles; population, 50,000; towns, 4; barrios, 10; capital, Cuyo.

Constabulary garrisons.

Station.	Commanded by—	Strength
Cuyo	Inspector Boren	19
Araceli	Sergeant	10
Bacuit	Corporal	11
Taytay	.....do	10

Total in province, inspectors, 1; enlisted men, 50; authorized enlisted strength, 75.
Expeditions and patrols, 2; miles covered, 20; arms captured, 2 shotguns.

Organization of the constabulary in this province was begun by Third-class Inspector Lemuel C. Boren, on March 1, 1902. He had been in the province, however, rendering aid to the military since December 26, 1901.

There is no ladronism whatever in the province, the inhabitants of which are of two largely different tribes, the people of Cuyo, Calamianes Islands, and Northern Paragua being Visayans, while the inhabitants of Southern Paragua are Moros. It is gratifying to know that there is no contention whatever between these people. In Paragua there is also the small semicivilized tribe of Tagbanoas.

The people of Cuyo are probably the most pronounced "Americanistas" in the archipelago.

It is a matter of history that when the Spaniards left the island, telling the natives that the Americans were coming to dominate over them, they received the news with a great deal of internal satisfaction, and immediately organized among themselves a provisional American government and awaited the advent of the Americans. The latter were a little slow in coming, however, and one day three or four proas, loaded with Tagalogs, sailed into the Bay of Cuyo. They were armed with about fifteen Remington rifles and immediately began the organization of a provincial insurgent government. The native Cuyanos did not take kindly to the insurgent government officials, and made life so uncomfortable for them that they sailed away again in their proas. Then the Americans came, and when they did come, they found the American flag flying and a reception committee on shore to receive them. The Cuyanos were overly pleased because they claimed an order had been issued by the insurgent government that a descent should be made on Cuyo without delay, with the object of burning the town and bringing the inhabitants of the island under subjection.

On the recent inspection trip of the second district chief to Cuyo he visited the schools and found present over 400 pupils. The comparatively small population of the town makes this remarkable. Most of the older scholars speak English very well. They tell stories to each other in English, sing songs in English, and are very enthusiastic. The older people of the towns attend night schools, and a word addressed to almost any native in the streets of Cuyo will be generally met with a very intelligent answer in English.

This state of satisfaction has been greatly created by the provincial governor, Captain Phillips, of the Tenth U. S. Infantry, who has resided with the Cuyaons almost continually since the American occupation.

ROMBLON.

Organized per act 104, March 18, 1901; governor, Francisco Sans, March 3, 1902; inhabitants, Visayans; area, about 135 square miles; population, about 38,000; towns 10; barrios, 5; capital, Romblon.

Constabulary garrisons.

Station.	Commanded by—	Strength.
Romblon	Inspector Pelle	35
Cajidiocan	Inspector Maabe	11
Odiongan	Sergeant	11
D. S. Leyte	Inspector Grove	29

Total in province: Inspectors, 3; enlisted men, 86; authorized enlisted strength, 100.

Expeditions and patrols, 12; miles covered, 605; arms captured, 3 Remington rifles, 1 Mauser rifle, 1 Mauser carbine, 2 shotguns, 2 revolvers; ammunition captured, 50 rounds Mauser and 20 rounds Remington.

First-class Inspector Winfield S. Grove started the organization of the constabulary in the province of Romblon on September 1, 1901. Inspector Grove was relieved on June 21 by First-class Inspector Leon J. Pelle, who is at present in command of the province.

Conditions in this province are very good. The people are very quiet and orderly. The military have been entirely withdrawn. There are no ladrone bands and the constabulary are very efficient.

SORSOGON.

Organized per act 124, April 30, 1901; governor, Bernardino Monreal, March 3, 1902; inhabitants, Bicols; area, about 786 square miles; population, about 99,950; towns, 19; barrios, 100; capital, Sorsogon.

Constabulary garrisons.

Station.	Commanded by—	Strength.
Sorsogon	Inspector Nevill	58
Irocin	Inspector Swann	40
Bulasan	Sergeant	10
Barcelona	Inspector Pulay	20
Donsol	Inspector Wright	22

Total in province: Inspectors, 6; enlisted men, 150; authorized enlisted strength, 162.

Expeditions and patrols, 150; engagements, 4; outlaws killed, 15; outlaws captured, 400; miles covered, 2,000; arms captured, 2 rifles, 4 shotguns, 2 revolvers, 1 carbine; ammunition captured, 350 rounds rifle, 10 rounds shotgun, 10 rounds revolver.

On August 30, 1901, First-Class Inspector Wilfred Turnbull arrived in the province and began organizing the constabulary. He was relieved in December, 1901, by First-Class Inspector Harvey P. Nevill, who is the present senior inspector.

At the time Inspector Nevill took command Francisco de la Cruz had started his own private revolution and was making the province very uncomfortable. In a short time, however, he and most of his followers were captured.

The Colache campaign.—The Colache campaign was very successful. I give below an extract from the report of Inspector Nevill, which sets forth in detail the operations from the beginning to the end:

"I take the liberty of including the work of the past two months in this report for the following reasons, namely: The months of April and May were busy ones for the constabulary of this province, as I was during this time conducting a campaign against a fanatical organization known as Anting Anting, commanded by one Antonio Colache. The end of April found the work unfinished, and the senior inspector with all other inspectors in the field. The district chief had been informed from time to time by wire of the progress of the campaign and the existing conditions and circumstances pertaining thereto and for the pressing need for my continued presence in the field.

"In my report of March 31 I related the circumstances of the capture and murder of the municipal police of Bulusan, which occurred on March 30. I at once ordered Inspector Swann to proceed to Bulusan with twenty men and institute a close search for the band, but he had anticipated my order and arrived in Bulusan on the 31st. After three days' work in the hills of that vicinity he was convinced that he was not confronted by a mere band of outlaws, but that the people of that entire section on the eastern coast were pitted against him, those not actually under arms were rendering every assistance possible to the Anting Anting, and he so advised me.

"It may seem strange to you that a hostile body of this proportion could organize and virtually take charge of a section of the province without the knowledge of the authorities, but it is nevertheless true, and it has now been demonstrated on two different occasions in this province, that it can be done. Last year De la Cruz had 400 men in the field before any of the authorities, military or civil, knew that trouble was at hand, and Colache accomplished the same aggravating feat. Once the mysterious contagion gains a few converts in a barrio it will sweep through it like an epidemic and the whole barrio will go over to the standard of the fanatics, and it seems that nothing short of gunpowder will disillusion them after once becoming a convert to the mysteries of Anting Anting.

"In order that you may better understand the intentions and purposes of the leaders of these organizations, I attach a copy of their charter, the original, with Colache's commission, having been captured among other papers in his camp, marked "A." You will note that the charter and commission are signed by De la Cruz, who was the leader of the trouble in this province last year during the months of September, October, and November, he having been captured on November 6, 1901. On the capture of De la Cruz, Colache escaped to the vicinity o Bulusan, and set about the reorganization of the then shattered forces of the Anting Anting.

"Colache had served an enlistment in the Spanish army, and was later a second lieutenant in the insurgent forces of this province, surrendering in Gubat to the Forty-seventh Infantry, and, taking the oath of allegiance, he then retired to the barrio of San Isidro, municipality of Bulusan, where he conducted a small business in hemp, etc.; he soon became involved in debt and then became a bandit.

"In organizing the forces of the Anting Anting, Colache was ably assisted by one Isaac Gamao, who had also been a prominent character during the De la Cruz régime. Gamao holds a peculiar position, and as yet I have not been able to establish his exact relation with the De la Cruz and Colache insurrection. De la Cruz states that he was commander in name only and that his name was affixed to all documents by order of Gamao, that Gamao directed all operations and was in reality the commanding officer, but used him as a scapegoat. I give credit to this story, as De la Cruz is a man of very low intellect, little above that of an animal, and can not write his name. Colache makes much the same statement and avers that Gamao was the main instigator of the disturbance and used his name in the same manner in which he used De la Cruz's in the former trouble, but inasmuch as all of them are now prisoners, we have the assurance that we have the guilty parties, and the matter of leadership amounts to little.

"On arriving in Bulusan on March 31, Inspector Swan operated in the hills of that vicinity until April 3, but accomplished little, except to discover the true state of affairs, which had been successfully hidden up to this time. On the afternoon of April 4 he, wishing to submit a report, sent a detachment of five constables to take the report to the barrio of San Vicinte, a distance of about 5 miles, with instructions to deliver the report to the 'Teniente' of the barrio, who would forward it, and they to return to Bulusan. The detachment arrived at San Vicinte about 3 p. m., and started on the return trip at 3.30 p. m. About forty minutes after leaving the barrio, they were attacked by Colache and his men, who were about 100 strong. The place of attack was admirably situated for an ambuscade of this kind, the road at this point just comes off of a hill and crosses a low swampy ravine which is overgrown with low underbrush through which runs a good-sized creek. Colache selected the creek for his place of attack and distributed his men to the right and left of the road on each side of the creek.

"The constabulary were in charge of Second-Class Private Ambrosio Fruto. The details of the fight, as I can learn them, are as follows:

"Ambrosio Fruto, Gabino Dio, and Sergio Dellosa were marching abreast; about 30 paces behind them came Eugenio Faraque and Fernando Filonia. The men in advance had just crossed the creek, when the bandits showed themselves, having the constabulary completely surrounded. Fruto immediately ordered his men to open fire, instructing them to cut their way to the sea, which was about 50 paces to the left; the attempt to do this proved futile, as they found bolomen massed on that side of them. The constabulary then turned and succeeded in cutting their way through the bolomen in the direction of San Vicinte, and it seems as if they might have escaped. They had gotten back some 300 yards, when a new band of bolomen came up from the direction of San Vicinte and attacked in the rear. In this rush from the front and rear Ambrosio Fruto and Gabino Dio were cut down. Sergio Dellosa, Eugenio Faraque, and Fernando Filonia survived the rush and again got through the circle, and some 300 yards farther up the road, which put them well up the hill. The bolomen seeing their prey about to escape, became frenzied and made another mad rush at the constables, and succeeded in cutting down Dellosa, who had fought them with a desperate resistance. Just at this point the road runs along a cliff overhanging the sea. When Dellosa was killed the two remaining constables jumped from this cliff into the sea, one of them dropping his gun when he jumped and the other threw his into the sea and recovered it the following morning. The two constables swam out to sea and were picked up by a friendly fisherman.

"In the fight the following ordnance was lost: One carbine, caliber .30; 1 Remington rifle, 2 Colt revolvers, caliber .45; 2 Remington shotguns, gauge 12; 2 revolver holsters, 2 waist belts, 2 waist-belt plates, 5 haversacks, and 1 web belt, complete. All ammunition carried by this detachment was lost, being about as follows: Sixty rounds of shotgun ammunition, 100 rounds of carbine ammunition, 20 rounds of revolver ammunition, and 40 rounds of Remington ammunition. I have been unable to determine how many shots were fired by the constabulary, but all unfired ammunition was either captured by ladrones or lost in the sea. The ladrone losses in the fight were 2 killed and 5 wounded. The first news that Inspector Swann received of the engagement was through a note from the 'Teniente' of San Vicinte, stating that the constables had been attacked and had fallen back to the barrio of San Vicinte. He started a detachment of 10 men to their relief (having received the note about 7 p.m.), who, on arriving in San Vicinte, found the two constables who had escaped, but owing to the darkness of the night were unable to recover the bodies of the dead constables. The next morning Inspector Swann found the bodies of the dead men, the condition of which would chill one's blood. Beginning from the toes to the top of their head there was not an inch of the body that had not been cut or hacked with a bolo. All joints of the legs and arms had been unjointed and the stomach laid open, leaving the frame hanging together by mere strips of flesh. The bodies were picked up in sheets and buried at Bulusan.

"As to the conduct of my men during the fight I have no criticisms to make. I know that Fruto, Dio, and Dellosa made a gallant fight without even the soldier's heritage of a fighting chance. I was at first suspicious of the conduct of Faraque and Filonia, but since the campaign I have questioned prisoners closely relative to the conduct of these two constables, and learn that, while they were probably not as steady as the other men, they did not desert them, nor did they attempt to run until they were all that remained, and taking into consideration that they were new men in the service, and the overwhelming odds against them, I do not think their conduct could be justly citicised. I received the particulars of this disastrous fight on the morning of the 6th of April, through a report from Inspector Swann, and left the station at 7 a. m. with 20 men, proceeding to Bulusan, arriving there on the morning of the 7th at 9 a. m.

"Here it might be well to offer this explanation: I will not attempt in this report to follow each expedition during this campaign, as they ranged far into the hundreds; many were fruitless; but from the 6th of April I waged a relentless warfare against Colache and his hordes, with confidence that I would ultimately bring about his capture or his death. I remained in the field in the vicinity of Bulusan from the 6th until the 11th with a force of 40 men and Inspectors Swann and Burton. I soon became convinced that nothing could be accomplished against the Anting Antings with scouting parties, so I determined to temporarily withdraw my force from the field, which I did on the 10th, and on the 11th proceeded to Sorsogon to confer with the governor and plan a systematic campaign against them. At this time Colache had about 400 men in the field and the sympathy of the eastern coast from Gubat to Santa Magdalena. His headquarters were in the hills west to Barcelona and Bulusan.

"After a consultation with the governor we determined to adopt the following plan: Establish a cordon of natives (volunteers) around the worst of the affected district, suspend all work within this cordon, and concentrate the people in the near-by towns or in barrios outside the cordon, operating inside the cordon with constabulary and additional volunteers. This would prevent the scattering of ladrones and the carrying of the contagious fanatical ideas to other parts of the province, and cut off the supply of food for those in the hills, which then would of necessity be drawn from the towns and would reduce my operations to as small a territory as possible. The volunteers were raised in each municipality by the presidentes on the request of the governor. On the 15th of April the volunteers of Sorsogon, Bacon, and Gubat were ready to move, each town furnishing 150 men divided into 3 sections of 50 men each, with 3 officers to each section and 1 general officer who exercised a command over the 3 sections. On the 16th I formed a line across the province from Abayug on the west to Buena Vista on the east with the volunteers of these 3 towns, and named Gregorio Medina, of Sorsogon, to take a general supervision of the entire line, giving him such instructions as I thought necessary. The 17th and 18th were utilized in forming the cordon from Bulusan to Irocin, and from Irocin to Casiguran, Bulusan and Irocin furnishing the men for the first line, with the presidente of Irocin in charge, and Juban and Casiguran the men for the second, with the presidente of Juban in charge. I had but about 40 extra guns at my disposal and I distributed them as judiciously as possible, the greater part of them going to the northern line, as I was very anxious to prevent the escape of ladrones in that direction.

"By the 19th I had perfected my cordon and was ready to begin the real work of hunting ladrones. I had reserved the volunteers of Bulan, Magalanes, and Matnog to assist me inside the cordon. During my seeming inactivity, Colache had moved his forces into and occupied the then deserted barrios of San Isidro, Santa Barbara, and Santa Cruz. On the night of the 19th, at 12 m., Inspector Swann with 20 men moved into the hills from Barcelona, and I went from Bulusan with the same number of men and Inspector Burton, giving Rufino Gerona instructions to follow me at daylight with his volunteers. Inspector Swann was to strike Santa Cruz, drive the bandits out, and continue south. I was to strike San Isidro and continue north, making a junction with Inspector Swann somewhere near Santa Barbara. The columns moved as indicated, and we found ladrones in each barrio, but they fled on our appearance, and we were unable to punish them other than drive them out. Inspector Swann joined me near San Isidro at 6 a. m. I determined to wait at San Isidro for Gerona, who came up at 10 a. m. with 300 volunteers. In the afternoon I dispatched Inspectors Swann and Burton with 15 constabulary and 100 volunteers to occupy the barrio of Santa Barbara; they arrived there at 6 p. m. Here, throughout the night, his outposts were harrassed by ladrones, who seemed to be spying rather than attacking. Here it might be well to state that this entire province is practically one vast hemp field, consequently these people experienced no trouble throughout this campaign in appearing and disappearing at their leisure.

"At daybreak on the 21st Inspector Swann went out with a scouting party of 10 constables, scouting the entire vicinity of Santa Barbara, finding traces of the ladrones everywhere, but failed to come up with any of them. He returned about 9.30 a. m. About 11 a. m. the ladrones opened fire on the barrio with about five guns and three revolvers, directing their fire against the houses occupied by the volunteers. At the first volley the volunteers became panic stricken, and it seemed as if they were going to flee, but Swann quickly got his constables formed and returned the ladrone fire. Then he found time to address a few reassuring words to the volunteers, who calmed down and formed themselves across the plaza, out of range of the ladrone fire. The ladrones, seeing the volunteers start to run, evidently thought that they were going to take the barrio, and just as Swann succeeded in re-forming the volunteers the ladrones charged in from the west side of the barrio. The constables were on the ladrones' right, and as they charged into the barrio poured a hot, if not effective, fire into their ranks. Swann, seeing that his constables were firing wild, secured a Krag rifle and opened fire on the ladrones nearest him, and the casualties of ladrones began to increase. The ladrones wavered and started to fall back. At this point the volunteers raised a great cheer and charged, and it seemed as if it might be bolo against bolo, but the ladrones had suffered some from the constabulary fire, and on the appearance of the volunteers they fled. Since the end of the campaign I have learned that the ladrone casualties in this fight were 4 killed and 6 wounded. Inspector Swann's losses were 2 volunteers wounded, both of Bulan, one slight—through the calf of the leg—and the other more serious, the ball having struck the kneecap, which will probably stiffen the leg. Colache tells me that he had about 150 men in that attack.

"From this fight Colache began to lose his forces, and as time grew on I pressed him harder and harder. As fast as he lost force I redivided my columns, putting as many columns in the field as possible, keeping one column around San Isidro and Capaganean, another at Santa Barbara, another around Santa Cruz and Fabrica, and another across the mountain range near Casiguran. At this time Inspector Swann and myself were the only inspectors that I had for field service, Inspector Burton being unfit for service on account of sore feet and Inspector O'Grady having all he could do to attend to his supply office. I soon saw that Rufino Gerona and Estaben Pulay, the presidente of Bulan and the justice of the peace of Barcelona. respectively, were able to take the field and command, so I did not hesitate to give each of them a detail of constabulary and send them into the field, and both of them served me honestly and well in the capacity of inspectors until the close of the campaign.

On April 27 I received a reinforcement from Masbate of twenty men, which I needed sorely, my men being run down by the constant and hard month's work. From April 27 I kept from four to six columns in the field all the time and maintained stations in the barrios of San Jose, Santa Barbara, and Fabrica. I found it advisable to do this, as detachments operating in the field could at all times be within reach of supplies and were nearer the field of operations. On May 4 Inspector Swann and Gerona struck Colache and about 30 men in camp in the mountains west of Santa Barbara. Here they captured 3 shotguns, killed 2 ladrones, and got all of Colache's correspondence, including the rolls of his organization. After this date the ladrone forces rapidly went to pieces and lost all resemblance to an organization. The siege that I had lain around them had kept all food from them since the 15th of April, and they had been chased and run day and night since that date, and they began to surrender in bunches of from 3 to 15. From the rolls captured by Inspector Swann and Gerona, I was able to make 93 arrests in Bulusan and some 50 in other towns in the province.

"On May 3, Inspector Velasque and 30 enlisted men reported for duty. This reinforcement gave me a total enlisted force of 153 men in the province, and from that date on I experienced no trouble in handling the situation. On May 11 I determined to decrease the territory of my operations, and to accomplish this I closed in my volunteer line. The northern line I pushed south, so that the wings rested in Casiguran and Barcelona. The line from Bulusan to Irocin I pushed as far up Bulusan volcano as possible, letting the right wing rest on Capaganean and the left in Mombon. I did not find it advisable to move the line from Irocin to Casiguran, as it was of minor importance, and the rugged foot of the volcano made it almost impossible for the line to ascend intact.

"The lines remained in this position until the 15th. On that date I ordered everything forward, with instructions to proceed until each line encountered the line in its front. This move I considered necessary, as the ladrones had quit establishing camps and were hiding about in the brush and hemp, more on the order of animals than human beings, and I had also received information that Colache had slipped through the lines and had escaped in the direction of Santa Magdalena, and I wanted to confirm this report before I transferred operations to that section. The general move toward the center began on the morning of the 15th and terminated on the 18th, and I considered it entirely successful, although it resulted in the capture of only four or five ladrones of no importance, but it demonstrated to the province that the heretofore considered inaccessible volcano was accessible even to its utmost heights, and it also confirmed the report of Colache's escape and I was enabled to transfer my operations with the assurance that I was leaving a clean country behind me.

"On the 19th I dispatched Inspector Swann and Gerona with 20 constables and 200 volunteers to the vicinity of Santa Magdalena. They struck Colache's camp on the morning of the 20th, but were unable to punish him other than to capture a few uniforms and bolos. Here Inspector Swann was attacked with fever and dysentery, and was compelled to return to Bulusan.

"The situation was now this: I had as prisoners practically all of Colache's band, including the greater part of his officers. He, with probably five companions, was still at large. I decided to dismiss all the volunteers and try and bring about the capture of Colache by the use of spies. This move was expedient, as the volunteers were being subsisted at a considerable expense to the municipalities and province, and I was loath to ask their services longer than was absolutely necessary, so after a conference with the governor we returned all volunteers to their pueblos on May 23. We also dispatched spies to Santa Magdalena to locate and report the whereabouts of Colache.

"On the evening of the 24th one of Gerona's spies overtook him at the barrio of Gata, and reported to him that Colache was then in camp near Taloanga, but would move at daylight, and, if not taken during the night, that he would probably escape. Gerona, with dispatch that is highly commendable, promptly organized an expeditionary column from men of the barrio and set off through the mountains for Colache's camp, with the spy as the guide. He struck the camp about 3 o'clock a. m. and captured everybody in it, consisting of Colache and Isaac Gamao and the two leaders of the disturbance, Lucio Bellen, Lorenzo Barcelo, Colache's wife and daughter, and Gamao's wife. The capture of these people closed the campaign.

"Summing up the work accomplished during these operations I arrived at the following: The constabulary were in the field 56 days; the volunteers, 38 days, taking 249 prisoners; this includes captures, surrenders, and arrests; among the number were 12 so-styled officers. Fifteen ladrones were known to be killed and 15 were known to be wounded. Four shotguns, 1 Remington rifle, 1 carbine, caliber .30, and 2 Colt's revolvers, caliber .45, were captured. It is unfortunate that the constabulary did not prove to be better shots, otherwise the ladrone element of this province would have been taught a lesson that they would not be slow to forget; but it is probably just as well as it was. Anyway it is evident that my constabulary are in need of target practice, and I shall provide it as soon as I can secure targets and establish ranges.

"I wish to highly commend the governor for his activity and assistance rendered me during this trouble, without which it would have been impossible for me to have stamped out the uprising with the force I had at my disposal, and I will say that if all native officials holding high offices prove to be as honest, conscientious and faithful as Governor Monreal has shown himself to be since he has filled the office of governor in this province that the government will be well served."

The governor of Sorsogon, Señor Bernardino Monreal, is a fair example of the efficient, unbiased, energetic, and conscientious native governor, who took the field himself in the cause of law and order, and left nothing undone which would aid the senior inspector in putting down the petty insurrection. That they will accomplish their task is shown by the excellent results and quick end of the operations. Colache, all of his chief officers, and about 200 followers are awaiting trial by the court of first instance. A great many ignorant followers were explained the oath of allegiance, which they took and were turned loose.

Governor Monreal and Señor Rufino Gerona, presidente of Bulan, were thanked in a very nice and appropriate letter from the acting civil governor and also by the second district chief. Conditions in the province are now in a very excellent condition.

TAYABAS.

[Including Infanta.]

Organized per act 103, March 12, 1901: Governor, H. C. Bandholtz, March 3, 1902; inhabitants, Tagalog; area, about 1,910 square miles; population, 126,718; towns, 20; barrios, 435; capital, Tayabas.

Constabulary garrisons.

Station.	Commanded by—	Strength.
Lucena	Inspector Smith	81
Tiaon	Corporal	10
Mauban	Inspector Castillo	50
Binangonan	Inspector Bennett	24
Lopez	Inspector Keesey	36
Calauag	Sergeant	20
Macalelon	do	16
D. S. Cavite	Inspector Bruin	50

Strength of province (including detachment in Cavite), inspectors, 8; enlisted men, 287. Authorized strength, 300.

Expeditions and patrols, 53; miles covered, 1,770; arms captured, 65 rifles, 11 revolvers, 78 bolos, 1 lance; ammunition captured, Mauser and Remington, 2,312 rounds.

First-Class Inspector George F. Connolly started the organization of the constabulary in this province the 1st of September, 1901. He was relieved by First-Class Inspector A. F. Yambert October 18, who was relieved by Second-Class Inspector W. N. Striplin December 19, 1901. Second-Class Inspector Patrick Bruin was assigned to command this province as senior inspector, per oral orders of Assistant Chief Taylor, in January, 1902. The present senior inspector, B. L. Smith, was assigned to the province April 17, 1902.

This province has been to a certain extent in a state of turmoil and discontent almost constantly from the first military occupation down to the present date. Conditions became very grave shortly after the institution of civil government in the province, owing to the majority of the inhabitants persisting in lending aid and comfort to a newly inaugurated revolutionary movement.

The section of the province bordering on Laguna and Batangas was practically placed under martial law until such time as the inhabitants saw their ignorance and folly in aiding the lawless revolutionary bandits still in the field. The desired results were brought about in the affected districts, through the able efforts of General Bell, by the end of April.

Conditions in the province are at present comparatively good. The chief ladrone bands still out are those of Rios, Destajo, Verastigui, and Encarnacion, with about 60 guns altogether. Rios and Destajo are operating in the vicinity of Mauban, Verastigui, and Encarnacion in the eastern part of the province.

The constabulary have done and are doing good work under Inspector Smith, and it is only a matter of time when the ladrone element will be wiped out entirely.

RECOMMENDATIONS.

The constabulary officers are well chosen, well trained, and efficient in their line of work, which is very arduous and dangerous, and it is thought that they are, in the junior grades especially, inadequately salaried, considering the fact that there is no pension or retirement for them in case they become incapacitated for service by reason of wounds or sickness acquired in line of duty. In order to raise or maintain the standard, and secure efficient officers who will be satisfied with their service, it is thought that better salaries should be offered, with an increase of 10 per cent after five years' service.

It is also recommended that the inspector be given an honorary title or grade in addition to that of inspector. That a first-class inspector, for instance, be given the title of captain; second-class, first lieutenant; third-class, second lieutenant; fourth-class, third lieutenant, and subinspectors, sublieutenant. A lieutenant should sign himself as "William Tyler, first lieutenant and inspector, P. C." This recommendation is made owing to the observation made that the native respects the title to a great degree and is inclined to use it anyway. Nearly the whole corps of inspectors desire it, and it is believed that its adoption would have its own particular influence in raising the status of the constabulary inspector and the service.

A uniform of khaki cloth it is thought should be adopted for the constabulary. It is the most durable, cheapest, neatest, and adaptable uniform for constabulary service that can be chosen. It can be obtained in any quantities at any time and at almost any place in the Philippines. The peculiar work which the constabulary are called upon to perform demands a uniform of particular qualifications embraced in color, texture, and durability of the khaki. There should be no serious objection to its use by the constabulary, as every foreigner, native, or citizen who so desires can wear it if he has the wherewithal to purchase it.

The constabulary uniform made of khaki with the usual red piping would be a handsome, neat, trim, appropriate, and durable uniform, and in my opinion should be worn with a canvas leggin, which would always, whether in barracks or field, give it a neat appearance. The constabulary men have a habit of getting these leggins second hand from the soldiers for use on their expeditions and patrols in the mountains, which act in itself would point to its apparent need.

The enforcement in some provinces of the present Spanish law in regard to the issuing of licenses to bear firearms has caused a great many arms to find their way into the hands of men who should not be intrusted with them. The recommendation has been renewed for adoption of regulations similar to the ones submitted in May by the fourth assistant chief. The need of legislation is very apparent in this connection.

It is thought that the secret-service bureau should be enlarged and a larger number of first-class detectives employed, as there is work for men of this sort in several parts of the archipelago at present—work that can not be accomplished by the local talent in the provinces, but could be accomplished with their aid under expert men who might be sent out from here. Our future tranquillity during the next few years will depend to a large extent on an efficient secret service.

Respectfully submitted.

J. S. Garwood,
Chief, Second District.

Aggregate result of operations in the second constabulary district from August 1, 1901, to July 1, 1902.

Number of expeditions	570
Number of miles covered	17,003
Number of engagements	31
Number of outlaws killed	75
Number of outlaws wounded	56
Number of outlaws captured and surrendered	574
Number and kind of arms captured:	
Cannon	9
Rifles	348
Carbines	2
Muskets	6
Shotguns	51
Revolvers	154
Swords	2
Bayonets	11
Bolos	90
Lances	1
Amount and kind of ammunition captured:	
Rifle ... rounds	5,291
Shotgun ... do	10
Revolver ... do	411
Remington empty shells	273
Mauser empty shells	91
Cans gunpowder	1½
Iron cannon balls	130
Number and kind of stolen animals recovered:	
Horses	19
Carabaos	40
Other property recovered:	
Money (Mexican)	$500
Blankets	10
Stolen clothing; insurgent uniforms	3
Wooden guns	5
Gold watches	2
Gold chain	1
Gold pendant	1
Diamond brooch	1
Cabanos rice	1,035
Webb belts	11
Field cornet	1
Rowboat	1

Number and kind of arms on hand in provinces of the second district of constabulary, July 31, 1902.

Provinces.	Shotguns.	Revolvers.	Rifles.	Carbines.
Albay	100	50	105	110
Ambos Camarines		37	70	120
Batangas		123	50	125
Cavite		164	191	175
Laguna	250	50	162	
Marinduque		21	61	
Masbate	53	51		50
Paragua		23	30	
Romblon	33	52	60	
Sorsogon	100	58	110	
Tayabas	114	16	145	
Total	650	645	984	580

Native ponies on hand July 31, 1902.

Albay	7
Ambos Camarines	0
Batangas	20
Cavite	0
Laguna	0
Marinduque	2
Masbate	0
Paragua	0
Romblon	0
Sorsogon	11
Tayabas	56
Total	96

Roster of inspectors on duty in the second constabulary district, July 31, 1902.

HEADQUARTERS OF THE DISTRICT, MANILA, P. I.

Fourth assistant chief, Jesse S. Garwood, commanding district.
Third class inspector, Edward R. Higgins, adjutant.

ALBAY.

Constabulary headquarters, Albay, P. I.

First class inspector, Zan F. Collett, commanding province.
Third class inspector, John Galt, supply officer.
Second class inspector, Harrison O. Fletcher, Virac, P. I.
Second class inspector, Robert J. Jahn, Polangui, P. I.
Third class inspector, Saturnino Nery, Guinobatan, P. I.
Subinspector, Ambrosio Masankai, Tabaco, P. I.

AMBOS CAMARINES.

Constabulary headquarters, Nueva Caceres, P. I.

First class inspector, George K. Armstrong, commanding province.
Fourth class inspector, John Arthur, supply officer.
Third class inspector, John B. Schuetz, Indan, P. I.
Fourth class inspector, Deogracias Buenaventura, Ragay, P. I.

BATANGAS.

Constabulary headquarters, Taal, P. I.

First class inspector, Samuel D. Crawford, commanding province.
Fourth class inspector, Frank Brown, supply officer.
Third class inspector, Will C. Garis, Taal, P. I.
Fourth class inspector, Charles M. Pendleton, Taal, P. I.
Subinspector, Aurelio Ramos, Taal, P. I.

CAVITE.

Constabulary headquarters, Bacoor, P. I.

First class inspector, Thomas R. Hayson, commanding province.
Second class inspector, L. R. Porter, supply officer.
Second class inspector, Percy A. Hill, Imus, P. I.
Second class inspector, William Green, Das Marinas, P. I.
Third class inspector, Pedro Guevara, Indan, P. I.
Fourth class inspector, Charles Toomes, Indan, P. I.
Fourth class inspector, William H. Carter, Bacoor, P. I.
Fourth class inspector, Charles C. Crook, Indan, P. I.
Subinspector, Julian Lopez, Carmona, P. I.
Subinspector, Santos Nocon, Indan, P. I.

LAGUNA.

Constabulary headquarters, Santa Cruz, P. I.

First class inspector, Winfield S. Grove, commanding province.
Fourth class inspector, Albert O. Frock, supply officer.
Second class inspector, August O. Sorenson, Santa Cruz, P. I.
Fourth class inspector, Archie M. True, Santa Cruz, P. I.
Subinspector, Nicomedes Flores, Santa Cruz, P. I.

MARINDUQUE.

Constabulary headquarters, Boac, P. I.

Second class inspector, R. H. Griffith, commanding province and supply officer.
Third class inspector, Peter L. McNeilly, Santa Cruz, P. I.

MASBATE.

Constabulary headquarters, Masbate, P. I.

First class inspector, F. J. Linforth, commanding province.
Fourth class inspector, James W. Walsh, supply officer.
Second class inspector, Christian Grossman, Uson, P. I.
Third class inspector, Abot Hester, Malbug, P. I.

PARAGUA.

Constabulary headquarters, Cuyo, P. I.

Third class inspector, Lemuel E. Boren, commanding province.
Fourth class inspector, A. LeR. Brown, supply officer.

ROMBLON.

Constabulary headquarters, Romblon, P. I.

First class inspector, Leon J. Pellé, commanding province.
Third class inspector, Lucian R. Sweet, supply officer.
Fourth class inspector, Silverio Maabe, Cajidiocan, P. I.

SORSOGON.

Constabulary headquarters, Sorsogon, P. I.

First class inspector, Harvey P. Nevill, commanding province.
Second class inspector, Frank J. O'Grady, supply officer.
Second class inspector, John W. Swann, Irocin, P. I.
Fourth class inspector, H. Edwin Wright, Donsol, P. I.
Fourth class inspector, Walter L. Brown, Sorsogon, P. I.
Subinspector, Estaben Pulay, stationed at Barcelona.

TAYABAS.

Constabulary headquarters, Lucena, P. I.

First class inspector, B. L. Smith, commanding province.
Second class inspector, S. W. Tilden, supply officer.
First class inspector, Patrick Bruin, Lucena, P. I.
Second class inspector, Edwin B. Keesey, Laguimanoc, P. I.
Third class inspector, Harry Coleman, Gumaca, P. I.
Third class inspector, Julio Herrera, Pagbilao, P. I.
Fourth class inspector, Charles E. Bennett, Binangonan, P. I.
Subinspector, Mariano Castillo, Mauban, P. I.
Total inspectors, 56.

List of present authorized enlisted strength and pay of constabulary in the provinces comprising the Second district.

Provinces.	Authorized strength.				Authorized pay.				
	First sergeant.	Sergeant.	Corporal.	Total.	First sergeant.	Sergeant.	Corporal.	First-class private.	Second-class private.
Albay	1	3	8	162	$50.00	$40.00	$28.00	$22.00	$20.00
Batangas	1	3	8	162	50.00	40.00	30.00	22.05	20.00
Camarines	1	3	8	162	50.00	40.00	28.00	22.00	17.00
Cavite	-------	-------	-------	225	50.00	40.00	30.00	25.00	20.00
Laguna	1	3	8	162	50.00	40.00	30.00	22.05	20.00
Marinduque	1	2	4	80	50.00	40.00	30.00	20.00	17.00
Masbate	1	3	8	130	45.00	35.00	25.00	20.00	16.00
Paragua	1	2	4	75	45.00	35.00	25.00	20.00	16.00
Romblon	1	2	5	100	40.00	30.00	23.00	18.00	15.00
Sorsogon	1	3	8	162	50.00	40.00	30.00	25.00	20.00
Tayabas	1	4	10	300	50.00	40.00	30.00	25.00	20.00

Total authorized enlisted strength of the Second district, 1,720.

PHILIPPINE CONSTABULARY,
OFFICE OF THE SECOND DISTRICT CHIEF THIRD DISTRICT,
Cebu, September 11, 1902.

To the Chief of the Philippine Constabulary, Manila.

SIR: In compliance with telegram of the chief dated August 29, I have the honor to submit herewith a report of the work of the constabulary of this district for the year ending July 31, 1902, giving especial attention to statistics. The tabulated statement appended hereto is made up from the monthly and quarterly returns and from special reports received from various provinces. A great number of changes in senior inspectors that have taken place has not served to make these reports as reliable as it is desired, although it is believed the appended report will give as true an account of the workings of the constabulary as it is possible to obtain at this time.

I have the honor to report that I assumed command of this district, which embraces all the islands south of Romblon and Masbate, on February 20 of this year; that on March 15 I proceeded to the province of Leyte to take personal charge of the operations there against the insurgent forces, and from that time up until the 30th of June most of my attention was given to that province and but little to the administrative work of the district. During that time I found opportunity to visit several other provinces.

Upon the organization of the constabulary, in August, 1901, the provinces of Antique, Iloilo, Capiz, Occidental Negros, Oriental Negros, and Surigao were in a state of peace, so far as armed insurrection was concerned. The provinces of Misamis, Leyte, and Cebu, although under civil government, were disturbed by a considerable force of organized insurgents yet remaining in the field.

The provinces of Samar and Bohol were in open insurrection and were under military control. In the month of December the insurgents of Cebu and Bohol surrendered to the military authorities, the province of Cebu having been returned to military authority some time previous, and the province was again placed under civil control on January 1. The province of Bohol was turned over to the civil authorities in April. The campaign of the military in Samar having ended by the surrender of all organized insurgent forces in that province, that island was turned over to civil control June 15. In the province of Misamis the surrender of Rufino Deloso in the western portion of that province, with 20 rifles and some 250 bolo men, on March 7, 1902, ended the insurrection in that province, the surrender being made to the constabulary. On June 19 and 29 of this year the entire insurgent force of Leyte was surrendered to the constabulary with over 200 arms of all classes and an organization commanding the services of over 600 men, thus completing the pacification of that island.

July 1, 1902, therefore, saw the end of all organized insurrection in the provinces of this district, and all provinces except those inhabited by Moros under the control of the civil authorities. The surrender of the insurgents in all provinces did not result in the surrender of all the arms that were not in the hands of the authorities, and at this time the following may be taken as a fair estimate of those arms remaining outside of the control of the authorities which are used for unlawful purposes: Province of Capiz, 12 or 15; province of Iloilo, 25 to 35; island of Negros, 20 to 30; island of Cebu, 7 to 10; island of Bohol, no definite information of the existence of any arms; island of Leyte, 6 or 8; islands of Surigao and Misamis, there is no information that any arms are in hands of ladrones o tulisanes.

The first year's work of the constabulary, taking into consideration all the difficulties that were to be contended with, has been most satisfactory, and a great amount of work tending to the pacification and tranquillity of the provinces has been accomplished by the inspectors, in spite of the fact that their men were both poorly disciplined and equipped. It may be said that the work accomplished in bringing about this state of affairs has been done to the neglect of paper work, which would not serve to record fully all the work accomplished, and it is believed that far more has been accomplished than the reports will show.

In many of the provinces the constabulary officers have from the beginning experienced more or less friction with the governors and other native officials; but this state of affairs is gradually growing better, and up to the present date there has been no conflict between the constabulary and other authorities that can be said to have been of a serious nature, and that in all the provinces a very commendable state of cooperation now exists.

It is believed that if "acts of the commission" could be furnished to every officer of the constabulary and to every native official, and that regulations governing nearly every question be provided to the constabulary, that there would be still less friction and a full cooperation between constabulary officers and all other civil officials. The difficulties that have arisen heretofore have been principally from lack of a clear understanding of the powers and authorities of various officials.

A number of Filipinos have told me that in their opinion the change from the old Spanish laws and customs to those of the American has been almost too radical to permit the Filipino to adapt himself to the new conditions, and that it may take a considerable number of years before even native officials will thoroughly understand procedure under American laws. As it is, they seem to grasp very readily the principles of American laws, but place upon them far too liberal an interpretation.

Strength and stations occupied July 31, 1902, of the provinces in Third district.

ANTIQUE.

	Inspectors.	Enlisted men.
Pandan	1	24
Ibajay	0	10
Bugason	1	18
Volerrama	0	13
Patnongan	0	13
San José	2	43
San Remigo	0	10
Absent detached service, Leyte	0	26
Absent	1	1
	5	158

Authorized enlisted strength, 162.

BOHOL.

Tagbilaran	3	52
Absent in pursuit escaped prisoner	1	10
	4	62

Authorized enlisted strength, no authorization.

CAPIZ.

Capiz	1	25
Dao	1	14
Pilar	1	15
Calivo	0	31
Maayon	0	9
Mambusao	0	9
Sapian	0	10
Liabcao	0	10
Tapas	0	10
Absent	1	-------
Detached service, Leyte	1	25
	5	158

Authorized enlisted strength, 162.

Strength and stations occupied July 31, 1902, of the provinces in Third district—Continued.

CEBU.

	Inspectors.	Enlisted men.
Cebu	2	61
Danao	1	23
Barrili	1	30
Tabogan	1	21
Absent, sick leave	1	----------
Special duty, Leyte	1	----------
	7	135

Authorized enlisted strength, 162.

ILOILO.

Iloilo	2	34
Sara	1	33
Pototan	1	51
Leon	1	37
Detached service, Leyte	1	37
	6	192

Authorized enlisted strength, 187.

LEYTE.

Tacloban	3	64
Biliran	0	15
Naval	0	15
Cabbiran	0	15
Leyte	0	15
Palompon	0	13
Ormoc	0	20
Matalom	0	34
Malitbog	2	25
Abuyog	1	19
Dagami	0	12
	6	247

Authorized enlisted strength, 250.

MISAMIS.

Oroquieta	2	40
Cagayan	1	25
Langaron	1	30
Jiminez	0	30
Detached service, Leyte	0	36
	4	161

Authorized enlisted strength, 162.

NEGROS OCCIDENTAL.

Bacolod	4	42
Guimbalaon	0	10
Murcia	0	16
Paguim	0	12
La Castellano	1	24
Magallion	0	12
Isabela	0	28
Payao	1	10
Himamaylan	0	9
Isio	0	12
Sipalay	0	22
Victoria	0	7
Manapla	0	16
Sagay	0	10
Escalante	0	11
San Carlos	0	12
Sick	1	0
Absent	1	0
	8	253

Authorized enlisted strength, 250.

Strength and stations occupied July 31, 1902, of the provinces in Third district—Continued.

NEGROS ORIENTAL.

	Inspectors.	Enlisted men.
Dumaguete	2	8
Bayun	1	2[illegible]
Zamboanguita	1	1[illegible]
Valle	1	20
Taysan	0	20
Absent in Bohol	1	40
Absent in Cebu	1	0
	7	163

Authorized enlisted strength, 163.

SAMAR.

Catbalogan	3	2

Authorized enlisted strength, 150.

SURIGAO.

Surigao	3	33
Butuan	0	30
Hinatuan	1	12
Dinangat	0	17
Absent	1	0
	5	92

Authorized enlisted strength, 100.

Total number of inspectors in third district, 60.
Total number of enlisted men in third district, 1,623.

Result of operations in the provinces of the Third district, from the date of their organization to August 1, 1902.

Antique.—Aggregate number of expedition, 21; miles covered, 1,909; arms captured, 5 rifles, 1 revolver; ammunition captured, 8 rounds Remington; stolen animals recovered, 16 carabaos; 1 child recovered, who had been kidnaped.

Bohol.—Aggregate number of expeditions, none; miles covered, none; property recovered, 1 banca (value $250), and money to the amount of $42 Mexican.

Capiz.—Aggregate number of expeditions, 54; miles covered, 1,892; arms captured, 7 rifles and carbines, 3 shotguns, 4 revolvers, 6 iron and 6 wooden guns, 1 murata; ammunition captured, 75 rounds; stolen animals recovered, 58 carabaos and 2 horses; other property recovered, effects of 8 peddlers, which had been taken from them by ladrones, were recovered and turned over to them.

Cebu.—Aggregate number of expeditions, 171; miles covered, 4,105; arms captured, 52 rifles and carbines, 21 shotguns, 13 revolvers; ammunition captured, 447 rounds; stolen animals recovered, 6 horses.

Iloilo.—Aggregate number of expeditions, 176; miles covered, 4,398; arms captured, 56 rifles and carbines, 26 shotguns, 9 revolvers, 150 native-made guns, 23 muratas; ammunition captured, 532 rounds; stolen animals recovered, 348 caraboas and 8 horses.

Leyte.—Aggregate number of expeditions, 209; miles covered, 9,135; arms captured, 1 cannon, 108 rifles and carbines, 33 shotguns, 83 revolvers; ammunition captured, 25 cannon balls, 1,728 rounds assorted; stolen animals recovered, 14 carabaos, 1 cow, 40 oxen; other property recovered, 3 lorchas, 27 bales of hemp.

Misamis.—Aggregate number of expeditions, 20; miles covered, 1,969; arms captured, 20 rifles and carbines, 6 revolvers.

Negros Occidental.—Aggregate number of expeditions, 445; miles covered, 15,922; arms captured, 1 rifle, 1 revolver; stolen animals recovered, 11 carabaos, 6 head of cattle, 8 horses; other property recovered, 1 sewing machine, 6 watches, much rice, tobacco, and other things.

Negros Oriental.—Aggregate number of expeditions, 23; miles covered, 1,168; arms captured, 1 revolver; stolen animals recovered, 1 carabao and 5 horses.

Samar.—(In process of organization.)

Surigao.—Aggregate number of expeditions, 24; miles covered, 905; arms captured, 6 rifles and carbines, 6 revolvers, 3 shotguns; ammunition captured, 24 rounds: stolen animals recovered, 3 carabaos, 1 horse; other property recovered, $440 Mexican.

Total number of expeditions, 1,143; total number of miles covered, 41,403; total number of arms captured, 255 rifles, 124 revolvers, 86 shotguns, 150 native-made guns, 6 iron and 6 wooden guns, 1 cannon. Total number of rounds of ammunition captured, 2,814 rounds assorted, 25 cannon balls. Total number of stolen animals recovered, 451 carabaos, 30 horses, 40 oxen, 7 head of cattle.

Ponies on hand in the provinces of the Third district, July 31, 1902.

Provinces.	Number on hand.	Number fit for service.
Antique	30	10
Bohol	8	8
Capiz	18	18
Cebu	10	7
Iloilo	22	22
Leyte	18	18
Misamis	8	8
Negros, Occidental	42	30
Negros, Oriental		
Samar		
Surigao	2	2
Total	158	123

Number and kinds of arms on hand in provinces of the Third district, July 31, 1902.

Provinces.	Shotguns.	Revolvers.	Rifles.	Carbines.
Antique	8	47	66	40
Bohol		25	100	
Capiz	49	34	93	
Cebu	80	56	120	207
Iloilo	12	43	154	
Leyte	225	14	289	
Misamis	140	105	80	80
Negros, Occidental	200	112	290	
Negros, Oriental	50	34	155	22
Surigao	17	80	70	
Total	781	550	1,417	327

Remarks on statistical report of the third district Philippines constabulary for the year ending July 31, 1902.

1. In the attached statistical report of the work of the constabulary of the third district for the year ending July 31, 1902, the figures under the heading "Strength, present and absent," shows the status on the 31st of July, 1902.

2. The figures under the heading "Equipments in use by the constabulary," are taken from the senior inspector's reports and not from the returns of the supply officers.

3. Under the heading "Constabulary casualties," the inspector killed in the province of Leyte was Mr. Neddo; the one in the province of Oriental Negros was a native subinspector, Obdulo Larena; the 2 enlisted men killed in Cebu were killed by accident; the 5 killed in Leyte and the 1 in Misamis were in combats with insurgents. All the men wounded in action against insurgents or ladrones. Those captured afterwards made their escape. Of the 26 desertions reported, but 3 deserted to the enemy in arms against the Government. The cause for the desertion of the balance can be attributed in most cases to failure to receive their pay; women and queridas were the cause of the other desertions. Of the arms lost in Leyte, 5 carbines and 7 Springfields were stolen by deserters or captured

in the rout of a small detachment of constabulary by over 150 bolomen. The others were arms captured from or delivered up by municipal police to insurgents and ladrones. It may be safely said that all of these arms have been recaptured or were surrendered upon the close of the insurrection in Leyte.

4. The heading "Buildings occupied" are taken from status, as shown June 30 of this year.

W. C. TAYLOR,
Assistant Chief in Charge.

HEADQUARTERS PHILIPPINES CONSTABULARY,
SECTION OF INFORMATION,
Manila, P. I., October 1, 1902.

The CHIEF OF THE PHILIPPINES CONSTABULARY, *Manila.*

SIR: In compliance with verbal instructions, I have the honor to submit the following report of operations of this section to include July 31, 1902:

Owing to the absence of any records whatsoever pertaining to the work performed by this section in the several provinces, and the manner in which the records of this office were kept prior to April 1, 1902, I am unable to make a complete and accurate report of all the work performed by this section for the year ending July 31, 1902.

Report of records in the clerical division up to and including July 31, 1902.

	Number
Cases:	
Cases open	68
Cases closed	170
Total	238
Cases classified:	
Murder	41
Arson	61
Estafa	20
Information wanted	31
Assault	6
Sedition	75
Rape	1
Abduction	3
Total	238
Warrants:	
Executed	63
On hand	16
Not found	3
Sent elsewhere	2
Total	84
Record of arrests:	
Of prisoners on hand July 31, 1902	50
Released	228
Delivered to other authorities	82
Serving sentence	33
In confinement	11
Total	404
Classification of offenses of prisoners in confinement:	
For murder	4
For estafa	2
For arson	11
For sedition	33
Total	50

Descriptive and information reports:

Province of—

Abra	None.
Albay	28
Antique	77
Bataan	15
Batangas	51
Benguet	None.
Bohol	31
Bontoc	None.
Bulacan	151
Cagayan	62
Camarines	86
Capiz	216
Catanduanes	None.
Cavite	26
Cebu	142
Cotabato	None.
Davao	None.
Ilocos Norte	20
Ilocos Sur	37
Iloilo	576
Infanta	1
Isabela	27
Laguna	53
Lepanto	None.
Leyte	49
Marinduque	21
Masbate	None.
Mindoro	11
Misamis	76
Negros Occidental	196
Negros Oriental	69
Nueva Ecija	71
Nueva Vizcaya	None.
Pampanga	141
Pangasinan	119
Paragua	44
Principe	8
Rizal	243
Romblon	41
Samar	143
Sorsogon	44
Surigao	53
Tarlac	109
Tayabas	36
Union	1
Zambales	55
Zamboanga	None.
Manila	189
Total	3,518

Photographs:

Criminal	1,362
Not criminal, including suspicious characters, etc	672
Total	2,034

Translations:

Translations of importance, not including operators' reports and ordinary letters	672
Operators' reports	7,620
Total	7,932

Correspondence:	
Letters and telegrams received, not including those pertaining to cases	599
Letters and telegrams sent not pertaining to cases	461
Telegrams received and letters received pertaining to cases	618
Letters and telegrams sent pertaining to cases	327
Grand total letters and telegrams received and sent	2,005
Report of operations of the map subsection:	
Maps issued	600
Tracings completed	18
Maps corrected	10
Negatives made	45
Plans made of various things (about)	30
Signs (about)	25

PERSONNEL.

The personnel of the section on July 31, 1902, consisted of 1 superintendent, 1 first-class inspector, 2 draftsmen, and 30 operators. The inspector (Theo. I. Owens) and the 2 draftsmen are assigned to duty in the map subsection. There being no provisions for a clerical force, I have been compelled to employ men as operators and detail them on special duty as clerks.

The following is a statement showing the assignment to duty of the several operators:

Assignment of operators and draftsmen:		
Number employed July 31		32
On special duty in map subsection	2	
On special duty, clerical division:		
Chief operator	1	
In charge of operators	1	
Stenographer and translator	1	
Translators and interpreters	2	
On record and photo case	1	
On record of arrest and criminal cases	1	
Messenger	1	
Total	10	
On duty as operators in the several provinces and the city of Manila	22	
Total		32

CASUALTIES.

On March 25, 1902, two operators were directed to return two carabaos, which were picked up by the city police department, to their proper owners, and in pursuance of such instructions they proceeded to Diliman, Rizal, and at that place were attacked by a band of ladrones, who wounded the two operators and finally murdered them.

On the morning of April 27, 1902, four operators were attacked by members of the same band, and one operator was killed and one wounded.

RECOMMENDATION.

With a view to further increasing the efficiency of the secret-service work of the archipelago, it is recommended that a system whereby the several provinces can be brought into close touch with each other, as well as with this section, be inaugurated.

The present conditions are not conducive to efficient service. As a rule, each province is ignorant of the conditions existing in the one adjacent, nor is there any means of disseminating information relative to the apprehension of parties who are wanted between said provinces, owing to the poor mail facilities.

It is recommended, in view of these conditions, that the following plan be considered and adopted:

First. That the criminal work pertaining to the archipelago be brought under the supervision of the section of information, which is by law under the immediate control of the chief of constabulary.

Second. That in each province a branch section of information be established, with the senior inspector in immediate charge.

Third. That the central office of the section of information, at Manila, be the repository of the criminal records pertaining to the several provinces, a duplicate report of same being kept on file in each province by the senior inspector thereof.

Fourth. That in all matters pertaining to the criminal work of the provinces the senior inspector thereof be authorized to deal direct with the central office and to render such reports as may be necessary for the proper and accurate keeping of records of all criminal matters pertaining to the archipelago.

The above recommendations are based upon the experience obtained during the past year, and in cases where information was wanted in one province it was afterwards found that the same could have been furnished by another province had there been a system whereby such information could have been furnished by the central office from the reports of provinces on file in this office. It has been noticed that criminals have escaped justice because of the lack of evidence at the immediate hands of the inspector making the arrest. One case can be cited which illustrates the futility of proceeding along the lines we are at present following, namely: Inspector Keithley arrested some time during the present year the notorious outlaw, Faustino Guillermo, and released him because of lack of evidence. Had this office been notified, sufficient evidence could have been furnished, no doubt, to hang him.

The operators of this section are to-day making efforts to arrest members of Guillermo's band who have either been killed or captured during the past two months and no reports have ever been received as to the names of the men above referred to as killed or captured by this office.

During the present year, it was afterwards found that the constabulary of Cebu could have furnished evidence which would have enabled certain inspectors operating in Leyte to have secured many convictions before the courts, but, owing to a lack of system and the apparent isolation of provinces in the matter of cooperation, these suspected men were permitted to escape punishment. In many cases certain citizens residing in one province are wanted as criminals in another.

It is further recommended, in case the system suggested be adopted, that a smaller but higher grade and better paid class of men be employed in the central office, these men to be used upon cases of importance in the several provinces and elsewhere when the local men are unable to cope with said case. In event there is lack of material in any province, the central office could supply men to such province after having given them a theoretical and practical course in the duties pertaining to the secret-service work. If there are any men, young and intelligent, whom the senior inspector has reasons to think would make good secret-service men, he can, upon approval of the chief, send these men to this office for instructions. This plan in time will result in developing excellent men and the rendition of good service.

Respectfully submitted.

E. G. CURREY,
Superintendent Section of Information.

EXHIBIT H.

BUREAU OF POSTS.

BUREAU OF POSTS, PHILIPPINE ISLANDS,
OFFICE OF THE DIRECTOR,
Manila, P. I., October 20, 1902.

The honorable the GOVERNOR OF THE PHILIPPINE ARCHIPELAGO.

SIR: I have the honor to submit the following report covering the operations of the bureau of posts for the fiscal year ending June 30, 1902. Herewith will be found tabulated statements covering the various branches of the postal service. The statements relative to finances are not given in as much detail as in the report for the preceding year. Such information, if desired, will be found in the reports of the auditor for the archipelago.

PERSONNEL OF THE SERVICE.

On July 1, 1901, the employees of this bureau numbered 130, of which 74 were Americans and 56 natives. During the year 135 Americans, 65 natives, and 1 Chinese interpreter, for the Manila post-office, were appointed.

Forty-nine Americans and 13 natives were separated from the bureau by resignation, 12 Americans and 31 natives by removal, 4 Americans by transfer to other bureaus, and 3 Americans and 2 natives by death. On June 30, 1902, there were 217 persons employed in the bureau, of which 141 were Americans, 75 natives and 1 Chinaman.

With the exception of the assistant director of posts, who was secured from the United States postal service, all of the appointments to the service made during the year were through the Philippine civil service, or under the provisions of sections 3 and 4, act 181, which authorizes the appointment of postmasters at the smaller offices without regard to the civil-service act.

REVENUES AND EXPENDITURES.

Table A shows an increase over the preceding fiscal year in the postal revenues of $14,979.36, or about 12 per cent. But of this amount $11,462.77 came from money-order fees. Therefore there was an increase of less than 3 per cent in the ordinary postal revenues. On the other hand, the expenditures of the service were slightly less than 16 per cent greater than for the preceding year. This discrepancy between the increase of expenditures and revenues is explained by the fact that during the year the amount of official mail handled has been more than doubled. Act 179 authorizes the use of the official envelope by all provincial as well as insular officials of the government. The many extensions of the civil government during the year have caused so great an increase in its official business that more than one-half of the mail we now handle, with reference to weight, is official business, and consequently carried free of postage. All of our reports relative to interisland business show an increase of more than 20 per cent in the bulk of the mail. In short, as a whole, our records show a greater percentage of increase in the amount of mail handled than in the increase in expenditures over the preceding year.

To properly handle the increased mails it was necessary during the year to increase the clerical force in the Manila post-office at an expense of more than $14,600 over the preceding year. It was also necessary to make some additions to the clerical force in other offices. The balance of the increase in salaries and wages is covered by the compensation allowed postmasters at new offices established.

Table A shows an apparent decrease in the payments for mail transportation. This is misleading, as the item for the fiscal year ending June 30, 1901, includes payments amounting to $9,833.44 properly chargeable to the fiscal year ending June 30, 1900.

The increase of over $12,500 in contingent expenses is chargeable almost entirely to new mail equipment, such as pouches, bags, street letter and package boxes, furniture, and other articles required for the proper handling of the mail.

In previous years the Manila post-office has been more than self-sustaining, but such is no longer the case. This change is due to the establishment of new post-offices throughout the islands which draw from the revenue of the Manila office, and also to the fact, as before stated, that a material increase in the clerical force was necessary to properly care for the official mail, from which no revenue is derived.

The great reduction of the military forces in the islands, which took place during this year and the latter part of the preceding fiscal year, had a material effect on the revenues and business of this service. It is a well-known fact that one company of American soldiers furnishes more postal business than is derived from 10,000 of the average native inhabitants. The business furnished by the large number of American civilians now in the islands has no more than equaled the loss sustained through removal of the soldiers. While it is also true that the native population is gradually increasing its patronage of the mails, it is nevertheless a fact that we will not derive much revenue from this source for a considerable time to come. In the meantime by far the greater part of the postal business will be with the American and European population.

MONEY-ORDER BUSINESS.

As stated in my last annual report, our money-order business was, by virtue of act 90, segregated from the money-order business of the United States and placed on an independent basis July 1, 1901. Before this change became effective arrangements were completed whereby we might continue issuing orders payable in the United States (including Hawaii and Porto Rico), Canada, and Cuba, and also to pay orders issued in those countries the same as in the past. We were, however, owing to certain technicalities, obliged to discontinue issuing money orders direct on foreign countries. The public suffered no great inconvenience thereby, as the amount of our business with European countries is very small, and arrangements were made for the transaction of this business through an exchange office of the United States. Negotiations are now under way looking to the reestablishment of direct money-order exchanges, not only with European countries, but with Japan and other eastern administrations. There is considerable demand for a money-order business between the Philippines and Japan, as well as with Hongkong, Singapore, and other points in the extreme east. It is believed that these extensions of the service will be greatly appreciated by the public.

The chief benefit derived from the change in the service caused by act 90 is that our money-order accounts are now audited in Manila by the auditor for the Philippine Archipelago. At the same time, the fees collected on money orders issued are now transferred to the postal revenues of the islands. The amount of these fees for the last fiscal year was $12,587.90. The first and only loss in the money-order business sustained by the Government since American occupation of the islands was in the robbery of the Jolo post-office, February 15, 1902, when money-order funds to the amount of $443.73 were stolen. The regulations provide for the payment of such losses out of fees collected, leaving the net revenue derived from the money-order business amounting to $12,144.17. Of this amount, $11,462.77 was transferred to the postal funds during the year. The exact total amount of fees collected during the year could not be determined in time to make a transfer of the balance before the close of business June 30.

At the beginning of the fiscal year 24 post-offices were authorized to transact the money-order business. During the year this service was extended to 9 new offices, and discontinued at 2 offices. It has been my policy to extend the money-order service to new offices, wherever there was a demand for it, as soon as the conditions would permit.

Table I gives a brief summary of our money-order business during the fiscal year. This statement shows an increase of over 39 per cent in the number of orders issued, as compared with the previous year, and an increase of 57 per cent in the number of orders paid.

In the United States the money-order business is used chiefly for the remittance of small amounts. This is shown by the fact that the average amount of each order issued there is less than $8. In the Philippines money orders are made use of for large transactions. The average amount of each order issued in the islands during the last fiscal year was $49.37, and the average amount of each order paid was $51.84. In previous years the money-order service was made use of chiefly by Americans, who understood its value. Through persistent efforts we are gradually convincing the native and Chinese population of the benefits of this branch of the postal service, and they are now making use of it to a great extent for the remittance of funds throughout the islands. The Chinese merchants are more susceptible to our arguments than the natives, and they are now our best and largest customers. It is believed that the present fiscal year will produce a much greater increase over last year in the money-order business than is shown by this report over the preceding year.

During the fiscal year postmasters at money-order offices throughout the islands made remittances to Manila amounting to $1,070,937.97. Remittances were made to the United States in the amount of $648,125.05. This sum represents the difference between the amount of orders issued in the United States and paid in the Philippines and the total amount of orders issued in the Philippines and paid in the United States. This is an indication of the extent to which the money-order business is used by Americans in sending money home. Our money-order service is also made use of to a great extent by Americans as a means of depositing their surplus funds for safe-keeping. A careful investigation of this point shows the amount so deposited at this time to be between $500,000 and $600,000. This amount is constantly increasing.

The handling of Mexican or insular currency in the money-order business has caused not only a great amount of extra work and inconvenience, but at times much complaint on the part of the public. During the first four months of the fiscal year, when insular currency passed freely at the ratio of 2 for 1, this money was handled without difficulty. When the commercial value of insular currency started to go down during the latter part of November, 1901, we began to experience difficulty in paying out this money at the Government ratio of 2 for 1 in the payment of money orders issued in the United States and presented for payment here. At the same time the efforts were made to purchase money orders with insular currency, in large amounts, payable in the States. After a conference with the acting civil governor and the secretary of finance and justice, an order was issued directing postmasters to discontinue accepting insular currency for money orders payable outside of the Philippines.

The establishment of the new ratio of 2.10 for 1, January 1, 1902, made it possible to again take a limited amount of insular currency in the money-order business. Postmasters were therefore authorized to accept small amounts from employees of the insular government, who were receiving their salaries in insular currency. This was continued until the latter part of March, 1902, when a still further drop in the commercial value of insular currency made it again impossible to dispose of such money accepted at the government rate of exchange. Therefore, another order was issued limiting the acceptance of insular currency to the purchase of money orders payable in the Philippines. When the ratio of 2.35 for 1 was established, July 7, 1902, postmasters were again authorized to take this money in payment for money orders payable outside of the Philippines.

So long as the government ratio is kept below or equal to the commercial rate of exchange, insular currency can be handled in the money-order business without serious difficulty, as it is in great demand for general use, and no one objects to receiving it in payment of an order which was purchased with United States currency. It was only during the periods when the commercial value of this money was less than the value placed upon it by the government that objections were made by the public to receiving it in payment for money orders which should have been paid in United States currency. It is understood, of course, that all of the insular currency accepted in the money-order business for orders payable outside of the Philippines had to be used in the payment of orders issued in other countries, and to avoid loss to the service it had to be paid out at the same ratio at which received.

REGISTRY BUSINESS.

The total number of articles registered during the year, when compared with similar report for the preceding year, shows an increase of 12 per cent. The records of the Manila post-office show an increase of 13 per cent over the previous year in the total number of pieces of registered mail handled. There was an increase of 20 per cent in the total amount of registered mail received from the United States, and of 13 per cent in the amount received from foreign countries. The total amount of registered mail sent to the United States shows a decrease of

4 per cent over the preceding year, while there was an increase of 18 per cent in the amount sent to foreign countries.

The reports further show an increase of 95 per cent in the number of pieces of official mail registered free. This large increase is due almost entirely to the provisions of act 179, which requires the free registration of all official mail of insular and provincial officials, when the sending official so requests.

DEAD-LETTER OFFICE.

Tables F, G, and H show in detail the transactions of the dead-letter office of this bureau. Comparison of these statements with last year's report shows an increase of 18,037 in the total number of pieces of mail matter handled in this office. During the year, 10,277 more pieces were returned to the United States than during the previous year, and 2,563 more pieces were received from the United States. The number of pieces returned to foreign countries during the year was 2,268 greater than during the preceding year, while the number of pieces received back from foreign countries was 100 less.

The large increase over the previous fiscal year in the number of pieces of mail returned to the United States must not be taken as an indication of any relaxation of our efforts to make delivery to the addressees. The greater part of the mail returned to the United States is for persons who return home before their mail reaches them. Furthermore, all undeliverable mail originating in the United States, as well as in foreign countries, is returned to the senders through the dead-letter offices of the postal administrations concerned. This is the case even though the returned matter bears the name and address of the sender.

By means of the directory mentioned elsewhere, we succeed in delivering a large amount of mail that would otherwise be returned to the country of origin.

INTERISLAND TRANSPORTATION.

During the year there has been a material increase in interisland communication, as will be seen by reference to Table M, which shows the number of mails received and dispatched to the provinces by the Manila post-office, and to Table K, which gives the number of mails received at and dispatched from each office. The present service is, however, still far from satisfactory, although the best possible use has been made of all water transportation. In addition to transports and other Government boats carrying the mails, all commercial steamers have, as heretofore, been required to carry the mails. On the whole, each important office has had a fairly frequent service, as will be seen by reference to Table K. It is the irregularity of the service and the inability of the people to know in advance when mails will be dispatched to or received from a certain place that causes the complaint.

The prevalence of cholera during the past seven months caused a material reduction in the available steamship transportation, thus seriously affecting the postal service.

The inauguration within the next few months of a regular steamboat service throughout the islands, under the supervision of the chief of the bureau of coast guard and transportation, by means of the steamers now in course of construction by the government, will make a very material improvement in the means of interisland communication, and will doubtless remove practically all of the complaint now lodged against this branch of the Philippine postal service.

No permanent system of land transportation has as yet been adopted. This question was discussed at a meeting of the Commission last June. At that time the chief of the Philippines constabulary stated that he would be able to furnish all of the land transportation for mails which would be required by this bureau. However, but little has been accomplished in this direction, owing to the loss of a great many of the horses owned by the constabulary and the inability of the chief of that bureau to obtain other necessary transportation.

Mails between the smaller offices are generally carried by the municipal authorities, under the requirements of paragraph (gg), section 39 of the municipal code. But wherever a satisfactory service can not be obtained by this means, temporary contracts have been made for regular transportation, if the constabulary could not furnish it.

The courier system of mail carriers established for inland towns has proven unsatisfactory when put in operation to and from places where a number of Americans are located. This is caused by the fact that the bulk of the mail varies greatly, and is frequently heavier than the regular courier can carry. But as soon as this condition arises additional allowances are made for the use of horses.

Furthermore, the courier service furnished by municipal authorities has proven unsatisfactory in some cases on account of frequent irregularities and delays. In such cases, if the faults could not be regulated, the municipal carriers have been dispensed with, and if the constabulary was unable to furnish the necessary transportation, other carriers were employed.

In this connection it is proper to state that the hearty cooperation by officials of the army, as well as by other departments of the insular government, has been of material assistance in transporting the mails. This is especially true of the quartermaster's department, which in many cases has come to our relief and furnished transportation that could not otherwise have been secured.

MAIL COMMUNICATION WITH THE UNITED STATES AND FOREIGN COUNTRIES.

The total amount of mail received from and dispatched to the United States during the year, as shown in Table N, when compared with the reports of the preceding year, shows a decrease of 10 per cent in the amount received and a decrease of 3 per cent in the amount dispatched.

The somewhat irregular mail service between the United States and the Philippines has been the cause of some criticism; yet a reference to Table N of this report will show an average of more than 7 mails per month received from and of more than 5 mails per month dispatched to the United States during the last year. The irregularities complained of refer more to uncertainty as to dates of arrival and departure than to infrequency of service. It is needless to say that not only this bureau, but the postal officials of the home government, have made the best possible use of every opportunity to dispatch mails to the United States and to the Philippines. In addition to the transport service, the China liners and the Canadian Pacific Steamship Line to Vancouver, B. C., are made use of whenever mails can be advanced by so doing. Of the 89 mails received from the United States, 59 were by liner. While it is true that many of the mails coming on liners consisted of no more than one or two bags, the figures are given to show the policy pursued. Of the 64 mails sent to the States, 29 were dispatched on liners.

The necessity for a regular steamship service, with schedule dates of arrivals and departures which can be relied upon, is very apparent, not only to the government, but to all business concerns. To improve the present service, either large subsidies will have to be paid or sufficient commercial business developed to justify steamship companies in operating steamers between the United States and the Philippines direct and on a fixed schedule.

The service to and from foreign countries is gradually increasing and becoming better. There was an increase of 10 per cent over the preceding year in the number of mails sent to foreign ports, and of 11 per cent in the amount of such mails. The service to Japanese ports is good, but there is often much delay to mails coming from Japan. This is due to the fact that but a few steamers come direct to Manila. Mails from Japan are of necessity generally sent via Hongkong, where frequent delays occur owing to lack of close communication with Manila.

EXTENSIONS AND IMPROVEMENTS.

On July 1, 1901, there were 24 post-offices in operation throughout the islands. These offices were located principally at the larger military posts. On July 31, 1901, the post-office at the First Reserve Hospital, located within the city limits of Manila, was discontinued, it being no longer necessary.

After the passage of act 181, authorizing the establishment of new post-offices and fixing the compensation of the postmasters, 66 new offices were established. Since the close of the fiscal year 70 additional offices have been opened, and other new ones are being established as fast as the preliminary arrangements can be completed. As a rule, the persons appointed as postmasters at the smaller offices are already in the employ of the government. These appointments are made under the special provisions of section 4, act 181.

With very few exceptions it has been found impossible to secure suitable persons not otherwise employed by the government who would accept appointments as postmasters at the small compensation authorized. The American school-teachers stationed throughout the islands have taken much interest in the establishment of post-offices at their respective stations, and with very few exceptions have accepted appointments as postmasters when asked to do so. In a few instances provincial treasurers and constabulary supply officers have been given these appointments. With a few exceptions, natives of the islands have not been given first appointments as postmasters. Americans have been given preference in appointment, believing that by so doing our American postal system can be more quickly and easily put into operation. After the natives become acquainted with our system they will be given appointments wherever changes are made.

When the transport *Thomas* arrived at Manila, August 21, 1901, a postal station was established at the Exposition Barracks in Manila, for the special accommodation of the large number of teachers who arrived thereon. This station was continued until the teachers were sent to their respective stations throughout the provinces.

The improved free-delivery service for the city of Manila, mentioned in my last report, was inaugurated in October, 1901, with 12 carriers. During the year this force was increased to 14. In connection with this service we have installed 63 letter boxes and 19 paper and package boxes throughout the city. From two to four collections are made daily from these boxes by the letter carriers. This service is evidently giving good satisfaction, as practically no complaints against it have been filed with the postmaster.

In January, 1902, a substation of the Manila post-office was established in the Walled City, and shortly afterwards 10 stamp agencies were established throughout other parts of the city, The substation is authorized to receive and deliver registered as well as ordinary mail, while the stamp agencies are for the sale of stamps only.

To facilitate delivery, and to avoid as much delay as possible to their mail, we have established in the Manila post-office a directory of Americans in the Philippines. The necessity for this became apparent shortly after the inauguration of civil government. The stations of Americans were changed so frequently that it was only by correcting the addresses of their mail and forwarding it direct to them that great delay can be avoided. By means of this directory mail for Americans, upon its arrival at Manila from the States, is distributed and dispatched in accordance with the last known address of the addressee, regardless of the original address on such mail. The only difficulty encountered in the entire successful operation of this directory has been found in the lack of cooperation on the part of the persons most deeply concerned. In many cases Americans fail to notify the postmaster at Manila of changes in their residence address, and then later on censure this service for consequent delays to their mail because it was sent as addressed to their former stations.

A special free-delivery service similar to that in the United States was also inaugurated during the year. This feature has not as yet been extended to all offices in the Philippines. But at the larger offices, where we have a clerical force, letters or packages are given immediate special delivery when bearing, in addition to the regular postage, one of those special-delivery stamps, which costs the sender 10 cents, United States currency.

I have so far been unsuccessful in my efforts to secure a reciprocal arrangement with the Postmaster-General whereby letters and other articles sent in the mails to the United States bearing our special-delivery stamps will be given immediate delivery. The Postmaster-General objected to my proposal on the ground that the United States Government received no revenue from the sale of these stamps, and could not therefore justly be put to the expense of making immediate delivery. Notwithstanding this decision, we are giving immediate delivery to all mail matter arriving from the United States which bears United States special-delivery stamps.

CONCLUSION.

On the night of February 15, 1902, the Jolo post-office was broken into and the small safe, containing money-order and postal funds, carried off. In addition to the loss of money-order funds previously mentioned in this report, postage stamps and postal funds to the amount of $223.07 were taken. Despite all our efforts to detect the guilty parties, no definite clew has yet been obtained. Some three months after the robbery occurred the safe was found in a bamboo thicket a few miles from Jolo, having been broken open and the contents abstracted.

In my last annual report mention was made of the need for a government post-office building in Manila. As this matter has since been made the subject of a special report, no further comment will be made herein, except to say that the extensions of the service throughout the islands have caused a material increase in the necessity for better facilities in the Manila post-office. It is also a fact that if we had a government building, conveniently located with reference to the water front, the mails would be received and delivered with much greater celerity than at present.

In last year's report it was stated that over 20 per cent of the letters sent to the United States during that fiscal year bore stamps issued and purchased in the United States, or were from soldiers and with no postage prepaid. With the great reduction in number of troops in the islands, the amount of mail of this class has been so materially reduced that the loss in revenue to this service is now very small.

I am pleased to be able to repeat statements contained in last year's report to the effect that, considering the conditions under which mails of necessity are handled, the complaints of losses and irregularities are much fewer than might be expected. In investigating complaints of thefts it is generally found that the senders are largely responsible, in that they trust their mail to other parties for depositing in the post-office. It has been found that many abstractions of valuable contents have been made from packages and letters before the articles are actually delivered into a post-office. Yet, as in all cases where the responsibility for loss can not be located elsewhere, it is always charged against the postal service. This condition is also true with reference to irregularities and delays in the transmission of mail. The public is generally disposed to charge the postal service with every delay or irregularity. It is a fact, however, that investigations made by this office on complaints received frequently locate the responsibility with either the sender or receiver of the article under investigation. Another and positive evidence of the responsibility of the senders is found in the large amount of mail which is returned to the writers direct or through the dead-letter office on account of being improperly or illegibly addressed.

In concluding this report I wish to say a word of commendation and appreciation of the work of the employees of the bureau. The work of a post-office employee is not only difficult, but trying. His work brings him in closer contact with the general public than is found in any other department of the government. He is the subject of much criticism, sometimes just, but more frequently unjust. He beholds the employees of other departments not only enjoying regular office hours and relief from duty on Sundays and legal holidays, but receiving Saturday afternoon holidays as well, while he is obliged to work overtime, early or late, and on holidays and Sundays as necessity and emergencies require.

Considering these conditions, it will be seen that our postmasters and other employees are especially entitled to much credit for the zeal and integrity with which they have performed their duties.

Very respectfully,

C. M. COTTERMAN,
Director of Posts.

TABLE A.—*Comparative statement of receipts and expenditures of the bureau of posts for the fiscal year ending June 30, 1902, with the previous fiscal year.*

	Fiscal year ending June 30, 1901.	Fiscal year ending June 30, 1902.
RECEIPTS.		
Stamp stock sold	$116,591.48	$119,183.87
Postage second-class matter	1,771.24	2,124.93
Waste paper sold	635.17	264.22
Box rents collected	3,834.74	4,776.20
Fees on money orders issued, transferred from money-order funds		11,462.77
Total	122,832.63	137,811.99
EXPENDITURES.		
Salaries and wages	113,709.51	136,905.79
Traveling expenses		459.25
Mail transportation	27,133.25	16,087.17
Contingent expenses	18,185.75	30,736.13
Total	159,028.51	184,188.34
Excess of expenditures over receipts	36,195.88	46,376.35

TABLE B.—*Comparative statement of appropriations and expenditures for the fiscal year ending June 30, 1902.*

	Amount appropriated.	Amount expended.	Unexpended.
Salaries and wages	$165,767.55	$136,905.79	$28,861.76
Traveling expenses	1,600.00	459.25	1,140.75
Mail transportation	22,100.00	16,087.17	6,012.83
Contingent expenses	38,573.44	30,736.13	7,837.31
Total	228,040.99	184,188.34	43,852.65

TABLE C.—*Statement of mails dispatched on commercial steamers to foreign ports by the Manila post-office during the fiscal year ending June 30, 1902, and amount paid for transportation.*

First port of call and name of steamer.	Number of trips.	Number of U. S. bags.	Foreign letters, net weight.	Foreign prints, net weight.	Amount paid.
HONGKONG.			*Grams.*	*Grams.*	
Sunkiang	11	43	164,954	293,007	$173.64
Esmeralda	6		43,695	79,951	40.52
Peru	1		16,999	71,045	19.64
Perla	12	20	124,570	153,804	118.32
Zafiro	12	38	221,254	403,474	224.09
Kashing	1		3,528	15,400	4.14
Yawata Maru	5		56,665	107,802	52.97
Rosetta Maru	19	58	221,298	474,495	241.00
Kasuga Maru	5	11	33,056	82,885	38.35
Gaelic	2	35	6,894	15,546	24.18
Yuensang	19	134	298,203	438,071	333.16
Tsinan	3		68,392	213,569	72.01
Salamanca	1		6,024	13,207	5.80
Airlee	3		10,598	24,120	10.29
Australian	3		12,285	47,732	13.84
Lennox	1		983	4,000	1.12
Hillglen	1		1,869	5,379	1.92
Shangtung	1		2,559	990	2.02
Quarta	1		2,671	6,677	2.65
Loongsang	22	387	358,350	698,232	530.01
Decima	1		1,560	1,191	1.29
Diamente	12	42	180,374	255,577	181.06
Sontua	1		6,154	5,255	5.13
Chingtu	2		9,422	15,567	9.57
Alesia	1		3,646	7,663	3.47
Taiyuen	5		41,439	64,205	37.31
Guthrie	4		13,098	16,236	11.38
Taicheong	3		15,816	32,938	15.06
China	2		2,576	7,113	2.62
Triumph	1		1,893	1,911	1.61
Changsha	3		14,877	29,824	14.05
Eastern	3		103,062	240,528	100.62
Amigo	1		4,946	15,861	5.32
Rubi	5	17	31,061	29,252	34.62
Kumana Maru	2	4	6,166	18,070	8.38
Aragonia	1		5,506	6,600	4.77
Amoy	1		1,341	6,481	1.63
Nippon Maru	1		14,927	40,458	15.12
Heathburn	1		5,774	8,681	5.17
Else	1		2,083	6,500	2.19
SINGAPORE.					
Lalpoora	3		72,850	228,953	76.85
Melpomene	1		19,003	43,348	18.45
Nerbudda	1		47,475	84,048	43.76
Nowshera	1		31,790	92,943	32.86
Tantalus	1		18,422	37,637	17.47
Taicheang	1		2,343	16,819	3.39
Tydens	1		6,087	11,432	5.68
Hyson	1		11,147	26,965	10.98
Yangtsze	1		19,731	65,940	21.20
Prometheus	2		42,453	122,882	43.76
Ixon	1	1	23,405	60,609	23.93
Mayune	1		22,532	63,848	23.09
Landaura	4		54,528	153,374	55.76
Alberto Treves	1		13,680	35,391	13.69
Kelantan	12	1	381,547	1,033,781	387.32
Chengmai	8		234,023	634,400	237.05
Isla de Luzon	1		41,479	116,394	42.40
Montevideo	1		42,151	181,592	49.22
Patani	2		27,036	67,105	26.79
Antonio Lopez	4	6	177,782	581,525	192.75
Pioneer	1		22,092	69,105	23.27
Isla de Panay	3		126,212	401,726	133.62
Pingsuey	1		76,851	338,808	90.50
Sirsa	1		27,218	92,091	29.34
Teenkai	1		806	50	.60
Memnon	1		15,406	57,194	17.10
Hans Menzell	1		896	1,100	.78
Maria de Larrinaga	2		87,870	254,728	90.61
Alicante	2		56,098	202,515	61.72
Indrani	1		360	1,500	.42
Kudat	3		129,522	317,627	127.95
Banca	1		12,463	24,087	11.69
Lindula	2		34,156	165,512	41.67
San Ignasio de Loyola	1		34,628	112,330	36.87
Daphur	1		50	200	.06

TABLE C.—*Statement of mails dispatched on commercial steamers to foreign ports by the Manila post-office during the fiscal year ending June 30, 1902, and amount paid for transportation*—Continued.

First port of call and name of steamer.	Number of trips.	Number of U. S. bags.	Foreign letters, net weight.	Foreign prints, net weight.	Amount paid.
SINGAPORE—continued.			*Grams.*	*Grams.*	
Loodiana	3	60	66,312	265,380	$105.47
Pyrrhus	1	....	14,199	48,051	15.31
Louise	1	....	25,319	63,882	25.19
Glenartney	1	....	4,142	8,024	3.89
Achilles	1	....	4,098	29,200	5.90
AUSTRALIA.					
Yawata Maru	2	....	5,909	19,860	6.36
Changsha	1	....	4,889	5,600	4.22
Kumano Maru	1	....	4,204	9,244	4.05
Taiyuen	1	....	1,723	10,310	2.29
Kasuga Maru	2	....	4,607	23,090	6.70
Eastern	1	....	4,639	10,989	4.55
Adata	1	....	1,525	2,753	1.41
Chingtu	1	....	3,309	12,150	3.66
Puritan	2	....	2,745	9,886	3.02
Tsinan	2	....	2,951	8,249	3.01
Taiwan	1	....	3,924	18,836	4.77
YOKOHAMA.					
Lalpoora	4	139	20,415	51,980	89.85
Booldana	2	56	8,306	23,303	36.49
Strassburg	1	1	2,341	9,677	3.20
Nowshera	1	79	3,763	5,283	42.83
Nerbudda	1	....	3,381	6,753	3.19
Lowada	1	....	563	950	.51
Loodiana	1	30	4,051	11,566	19.16
Landaura	3	289	10,734	29,158	155.39
Lindula	1	41	1,360	5,066	22.01
Sirsa	1	179	14,077	37,335	103.68
Palatinici	1	....	3,987	19,511	4.88
MOJI.					
Rokeby	1	....	1,406	5,436	1.58
Horda	1	....	10	....	.01
Crusader	1	....	2,890	7,993	2.95
THURSDAY ISLAND.					
Chingtu	2	....	3,997	6,874	3.66
Taiyuen	1	....	9,033	17,297	8.45
Rpsetta Maru	1	....	4,344	18,907	5.09
SAIGON.					
China	1	....	20	....	.02
Nanyo Maru	1	....	10	200	.03
Amigo	2	....	276	100	.15
Esmeralda	4	....	1,311	1,735	1.14
Elg	1	....	30	....	.02
Nanyang	1	....	20	....	.02
Mauban	2	....	138	715	.91
Denteras	2	....	200	670	.22
Independent	1	....	126	100	.10
Kintuck	1	....	78	100	.07
Peiyang	1	....	40	....	.03
Bjork	1	....	60	220	.07
Hans Menzell	1	....	20	150	.03
Babelsberg	1	....	40	170	.05
NORTH BORNEO.					
Patani	1	....	90	....	.07
BANGKOK.					
Pakshau	1	....	10	....	.01
Bangkok	1	....	160	....	.12
SHANGHAI.					
Athesia	1	....	498	1,600	.53
Verona	1	....	909	1,000	.78
Ataka	1	....	150	2,350	.34
Longships	1	....	591	5,600	.98
Aragonia	1	....	308	300	.28
Total	324	1,671	4,288,898	10,474,449	5,071.32

TABLE D.—*Detailed statement of payments to foreign countries for transportation of Philippine mails during the fiscal year ending June 30, 1902.*

Austria	$8.70
Belgium	1,160.65
France	3,778.52
Germany	13.88
Great Britain	493.32
Hongkong	4,146.48
India	1.74
Straits Settlements	114.18
United States	50.76
Total	9,768.23

TABLE E.—*Statement of stamp stock account of the bureau of posts for the fisca year ending June 30, 1902.*

Date.		Dr.	Cr.
1901.			
July 1	Stamp stock on hand in office director of posts	$101,322.03	
1	Stamp stock on hand in post-offices	28,017.48	
31	Sales for the month		$10,297.42
Aug. 30	Amount of stock received from Department, Washington, D. C	136,810.80	
31	Sales for the month		8,419.63
Sept. 25	Amount of stock received from Department, Washington, D. C	4,464.00	
30	Sales for the month		10,019.44
Oct. 15	Amount of stock received from Department, Washington, D. C	5,016.80	
31	Sales for the month		9,121.06
Nov. 6	Amount of stock received from Department, Washington, D. C	24,500.00	
13	Amount of stock received from Department, Washington, D. C	220.00	
30	Sales for the month		12,040.40
Dec. 14	Amount of stock received from Department, Washington, D. C	57.10	
31	Sales for the month		9,954.28
1902.			
Jan. 31	Sales for the month		10,075.11
Feb. 6	Amount of stock received from Department, Washington, D. C	556.00	
28	Sales for the month		9,246.47
Mar. 10	Amount of stock received from Department, Washington, D. C	66,904.85	
31	Sales for the month		10,528.07
Apr. 30	do		8,596.67
May 26	Amount of stock received from Department, Washington, D. C	33.00	
27	Amount of stock received from Department, Washington, D. C	26.50	
31	Sales for the month		11,519.45
June 30	do		9,365.87
30	Stamp stock in hands post-offices		22,259.16
30	Stamp stock in hands director of posts		226,485.53
		367,928.56	367,928.56

TABLE F.—*Statement of articles received and disposed of in dead-letter office, bureau of posts, during the fiscal year ending June 30, 1902.*

RECEIVED.

Source from which received.	Registers.	Ordinary letters.	Postal cards.	Packages.	Total.
On hand undisposed of July 1, 1901	18	1,073	4	12	1,107
United States	220	10,800	13	189	11,222
Foreign countries	47	889	21	70	1,027
Manila post-office	829	45,668	518	982	47,997
Other Philippine sources	20	1,739	7	89	1,855
Returned after attempt to find sender	55	2,267	4	105	2,431
Total to be accounted for	1,189	62,436	567	1,447	65,639

TABLE F.—*Statement of articles received and disposed of in dead-letter office, bureau of posts, during the fiscal year ending June 30, 1902*—Continued.

DISPOSED OF.

Disposition made.	Registers.	Ordinary letters.	Postal cards.	Packages.	Total.
Returned to the United States	405	33,330	224	548	34,507
Returned to foreign countries	403	4,468	242	463	5,596
Request matter returned to sender in the Philippines	310	10,148	59	181	10,698
Opened and returned to senders		9,343		85	9,428
Containing money, drafts, stamps, etc., returned to senders		108			108
Containing other valuables returned to senders				37	37
Destroyed		2,744	38	14	2,796
Destroyed after attempt to find senders	8	2,267	4	1	2,280
Filed, containing money, drafts, stamps, etc		28			28
Filed, containing other valuables	63			95	158
Filed, overweight				3	3
On hand June 30, 1902					
Total accounted for	1,189	62,436	567	1,447	65,639

PIECES OF MAIL MATTER ON FILE.

Registered letters and packages	78
Containing money, drafts, stamps	42
Containing other valuables	355
Overweight packages	3
Total	478

TABLE G.—*Detailed statement of articles received from foreign countries and offices by the dead-letter office, bureau of posts, during the fiscal year ending June 30, 1902.*

From—	Registers.	Ordinary letters.	Postal cards.	Packages.	Total.
Argentine Republic		5			5
Ceylon		19			19
Cuba	4	49			53
China:					
Hongkong		265	11	18	294
Shanghai	1	19			20
Cochin China		1			1
Great Britain	8	106	6	8	128
Hawaii	2	58		1	61
India	2	8			10
Mexico	4	12			16
Japan		38			38
New South Wales	2	20		1	23
New Zealand		3			3
Porto Rico		15			15
Queensland		11			11
Spain	24	201	3	41	269
Siam		1			1
Straits Settlements		58	1	1	60
Total	47	889	21	70	1,027

TABLE H.—*Detailed statement of articles returned to foreign countries and offices by the dead-letter office, bureau of posts, during the fiscal year ending June 30, 1902.*

To—	Registers.	Ordinary letters.	Postal cards.	Packages.	Total.
Austria	12	68	13	1	94
Argentine Republic	5	10			15
Barbados		1			1
Bermuda	1	4			5
Belgium	7	45	10	8	70
Brazil	1	3			4
British East Africa		1			1
Canada	4	410	1	9	424
China:					
Pekin		5	1		6
Shanghai	17	66		1	84
Hongkong	50	422	23	8	503
Tien Tsin	1	2			3
Cochin China	4	10			14
Cape Colony	3	13			16
Ceylon		17	2	1	20
Colombia		3			3
Costa Rica		2			2
Cuba	2	99	1	1	103
Denmark	3	51		1	55
Danish West Indies		1			1
Egypt	2	16	1		19
France	16	93	11	141	261
Germany	35	317	91	98	541
Gibraltar		12			12
Great Britain	18	1,149	10	153	1,330
Greece	3	17			20
Guatemala		4			4
Guam	1	18			19
Hawaii	1	90	3		94
Honduras		1			1
Italy	5	63	4	3	75
India	7	75	3	2	87
Jamaica		3		1	4
Japan:					
Tokyo	10	211	15	3	239
Kobe	3	23	2	1	29
Yokohama	5	18	3	1	27
Java	2	37	2		41
Luxemburg		7			7
Malta		9			9
Mauritius		1			1
Mexico		15			15
Mozambique		1			1
Macau	1	5	2		8
Netherlands		35	4		39
Newfoundland		4			4
New South Wales	1	113	2	3	119
New Zealand		26			26
Norway	2	70	1		73
Natal	1	3			4
North Borneo	2	4			6
Peru		3			3
Portugal		2			2
Queensland	8	28	1		37
Roumania	1	1	6		11
Russia	8	61	4		73
Straits Settlements	13	121	11	1	146
Sweden	2	69	4		75
Switzerland	3	17	3	9	32
South Australia	1	11			12
Siam		3	1		4
Spain	116	382	5	37	540
Tasmania		4			4
Transvaal		2			2
Turkey	5	16			21
Uruguay	2				2
Venezuela		2			2
Victoria	3	54			57
West Australia	16	12	2		30
West Indies:					
St. Kitts		2			2
Sta. Lucia		1			1
St. Vincent		1			1
Total	403	4,468	242	483	5,596

TABLE I.—*Comparative statement of the money-order business of the Philippine Islands for the fiscal year ending June 30, 1902, with the previous fiscal year.*

	Fiscal year ending June 30, 1901.	Fiscal year ending June 30, 1902.	Increase.
MANILA.			
Number of orders issued	29,103	33,523	4,420
Amount	$1,514,434.71	$1,854,927.36	$340,492.65
Fees collected	$6,098.61	$7,070.96	$972.35
Number of orders paid and repaid	15,739	23,416	7,677
Amount	$944,916.88	$1,257,069.33	$312,152.45
OTHER OFFICES.			
Number of orders issued	17,086	30,874	13,788
Amount	$730,439.61	$1,323,611.97	$593,172.36
Fees collected	$3,068.39	$5,516.94	$2,448.55
Number of orders paid and repaid	2,537	5,364	2,827
Amount	$111,954.65	$234,838.71	$122,884.06
SUMMARY.			
Total number of orders issued	46,189	64,397	18,208
Amount	$2,244,874.32	$3,178,539.33	$933,665.01
Fees collected	$9,167.00	$12,587.90	$3,420.90
Total number of orders paid	18,276	28,780	10,504
Amount	$1,056,881.53	$1,491,908.04	$435,026.51

Average amount of each money order issued, $49.37.
Average amount of each money order paid, $51.84.

TABLE J.—*Statement showing number of letters and parcels registered at each post-office during the fiscal year ending June 30, 1902.*

Office.	Domestic (including United States).		Foreign.		Number of pieces registered free.	Total.
	Letters.	Parcels.	Letters.	Parcels.		
Angeles, Pamp	146	91			24	261
Aparri, Cag	,235	922	84	11	340	2,592
Atimonan, Tay	18	22				40
Bacolod, Negros	1,126	421	78	9	266	1,900
Bacolor, Pamp					1	1
Baguio, Ben	28	15	1		18	62
Balanga, Bataan	53	7	7		26	93
Balayan, Bat	18	12				30
Baliuag, Bul	4	5			6	15
Bangued, Abra	20	10			9	39
Batangas, Bat	703	,087	33	3	201	2,027
Bautista, Pang	207	152	1	1	18	379
Bayombong, N. V	2	11			5	18
Boac, Marinduque	55	58	2	1	91	207
Borongon, Samar	91	62			18	171
Cabogan, Nuevo, Isa	5					5
Cagayan, Mis	176	120			76	372
Calamba, Lag	787	980	5	2	104	1,878
Capiz, Capiz, Panay	51	20		2	7	80
Catbalogan, Samar	674	404	32	8	219	1,337
Cavite, Cav	1,952	3,865	410	55	452	6,734
Cebu, Cebu	2,383	1,849	775		385	5,392
Cervantes, Lep	13		9			22
Corregidor, Cavite	176	213			35	424
Cottabato, Mindanao	128	196	33		31	388
Cuyapo, N. E	1	1				2
Dagupan, Pang	,175	1,130	57	22	642	3,026
Dumaguete, Negros	164	67	12	1	31	275
First Reserve Station	34	83	4			121
Iba, Zambales	14	5			1	20
Ilagan, Isa	95	48	5	1	17	166
Iligan, Mis., Mindanao	60	61	4		1	126
Iloilo, Ilo., Panay	,843	2,587	999	123	228	6,780
Jolo, Jolo	286	456	333	6	48	1,129
Laguan, Samar	27	6	1			34
Lallo, Cagayan					3	3
Laoag, I. N	479	244	130	33	182	1,068
Legaspi, Alb	504	427	56		227	1,214
Lingayen, Pang	154	102	2	1	54	313
Lubao, Pamp	1	5				6

TABLE J.—*Statement showing number of letters and parcels registered at each post-office during the fiscal year ending June 30, 1902*—Continued.

Office.	Domestic (including United States).		Foreign.		Number of pieces registered free.	Total.
	Letters.	Parcels.	Letters.	Parcels.		
Lucena, Tay	523	583	32	3	211	1,352
Malolos, Bul	100	145	4	1	10	260
Manila, Manila	17,087	28,829	19,890	4,903	4,446	75,155
Masbate, Mas	55	10			10	75
Misamis, Mis., Mindanao	102	71	3	1	32	209
Naic, Cavite	20	7				27
Natividad, Pang	1					1
Nueva Caceres, C. S	797	864	86	17	85	1,849
Olongapo, Zambales	151	167	13		19	350
Orion, Bataan	57					57
Oroquieta, Mis., Mindanao	61	66	2		6	135
Pasig, Riz	72	33			49	154
Pilar, Bataan	3					3
Romblon, Rom	28	13	8		8	57
Rosario, Cav	11	50				61
San Fernando, Pamp	332	450	25	4	208	1,019
San Fernando, Union	324	388	12	3	151	878
San Isidro, N. E	391	258	5	6	205	865
San Jose, Ant., Panay	8				5	13
Santa Cruz, Lag	525	463	34	35	211	1,268
Sorsogon, Sor	415	278	31	10	62	796
Surigao, Sur., Mindanao	7	4			7	18
Taal, Batangas	64	45			9	118
Tacloban, Leyte	1,089	754	105	7	269	2,224
Tagbilaran, Bohol	3	1	4	2	2	12
Tanauan, Batangas	147	63	4	1	31	246
Vigan, I. S	1,213	1,283	131	24	292	2,943
Virac, Albay	15	5	3		4	27
Zamboanga, Za., Mindanao	1,147	1,018	124	4	63	2,356
Total	40,636	51,592	23,589	5,300	10,161	131,278

TABLE K.—*Statement showing amount of mail received and dispatched from each post-office for the fiscal year ending June 30, 1902.*

Office.	Mails.		Locked pouches.		Sacks of paper mail.	
	Received.	Dispatched.	Received.	Dispatched.	Received.	Dispatched.
Abucay	16	14	14	14		
Angeles	657	657	660	658	33	
Aparri	195	155	120	130	1,390	962
Atimonan	12	20	48	41		
Bacolod	850	821	182	245	469	407
Bacolor	6	4	6	4		
Baguio	59	61	89	93	3	
Balanga	98	98	100	100	60	6
Balayan	8	11	4	6	7	6
Baler	2	2	7	2	4	
Baliuag		19				
Bangued	8	12	7	9		
Batangas	556	971	331	260	1,057	999
Bautista	909	951	1,026	1,082	71	10
Bayombong	8	8	4	5	17	7
Boac	35	34	70	43	26	11
Borongan	18	27	88	91	21	15
Cabagan Nuevo	23	21	12	9		
Cagayan	49	61	130	178	88	50
Calamba	929	886	440	426	1,273	869
Capiz	22	23	71	36		
Catbalogan	274	289	101	115	1,182	1,040
Cavite	698	701	1,596	1,571	1,179	920
Cebu	756	993	252	267	3,071	3,221
Cervantes	6	7	1	1	12	2
Corregidor	219	219	219	219	53	
Cotabato	45	76	80	65	79	60
Cuyapo	10	8		1		
Dagupan	760	763	749	939	1,998	1,848
Dinalupijan	95	96	94	95	2	1
Dumaguete	45	44	107	48		
First Reserve station	57	57	57	57	6	4
Iba	2	1	1		7	

TABLE K.—*Statement showing amount of mail received and dispatched from each post-office for the fiscal year ending June 30, 1902*—Continued.

Office.	Mails.		Locked pouches.		Sacks of paper mail.	
	Received.	Dispatched.	Received.	Dispatched.	Received.	Dispatched.
Ilagan	40	40	55	45	88	55
Iligan	5	8	10	18	8	4
Iloilo	886	1,072	245	247	3,274	3,246
Jolo	252	318	31	40	580	406
Laguan	43	32	5	5		
Lallo	6	6	6	6		
Laoag	188	214	132	111	511	367
Legaspi	175	145	103	118	409	161
Lingayen	222	222	216	214	358	28
Lubao	36	36	5	7		
Lucena	509	420	418	404	1,546	1,220
Mabatang	109	106	109	106		
Malolos	809	879	506	817	111	46
Manila	3,756	4,657	6,912	8,457	24,178	34,719
Masbate	15	14	13	6	10	4
Misamis	67	77	99	79	23	3
Naic	32	32	33	32		
Namacpacan	5	4				
Nasugbu	2	4	6	3	1	
Natividad	13	3				
Nueva Caceres	395	559	345	509	897	493
Olongapo	62	61	62	62	55	17
Orani	214	214	214	214		
Orion	119	116	119	116		
Oroquieta	58	62	91	60		
Pasig	232	224	240	242	80	3
Pilar	108	108	108	108		
Romblon	6	5	1	7		
Rosario	46	45	46	45		
Samal	96	91	37	35		
San Fernando, Pamp	727	726	741	751	457	33
San Fernando, Union	272	308	220	225	445	473
San Isidro	256	273	433	878	731	414
San Jose	2	2	12	1		1
Santa Cruz	1,195	1,273	1,020	1,105	706	343
Sorsogon	98	111	85	73	355	202
Surigao	6	8	10	11		
Taal	44	51	61	54	2	
Tacloban	251	371	290	386	1,967	1,443
Tagbilaran	3	3	1		1	
Tanauan	104	104	160	138	12	4
Vigan	392	382	221	260	1,529	1,903
Zamboanga	296	292	105	124	1,782	1,470
Total	20,579	20,788	20,192	13,929	52,224	57,496

TABLE L.—*Statement showing number of registered letters and parcels received from and dispatched to United States, foreign countries, and Philippine post-offices by the Manila post-office during the fiscal year ending June 30, 1902.*

	United States.	Foreign countries.	Philippines.	Total.
RECEIVED.				
Registered letters for delivery	4,833	20,192	12,897	37,922
Registered parcels for delivery	13,892	19,691	1,124	34,707
Registered letters in transit	4,810	3,440	16,530	24,780
Registered parcels in transit	11,468	1,939	22,198	35,605
Total	35,003	45,262	52,749	133,014
SENT.				
Letters registered	13,479	19,516	3,608	36,603
Parcels registered	26,656	4,778	2,173	33,607
Letters in transit	11,226	3,967	9,587	24,780
Parcels in transit	21,568	320	13,717	35,605
Letters registered free	20	374	1,295	1,689
Parcels registered free		125	2,632	2,757
Official letters registry fee paid	133			133
Official parcels registry fee paid	139			139
Total	73,233	29,080	33,004	135,321
Sacks registered mail received	1,649	1,399	3,169	6,217
Sacks registered mail sent	2,735	1,069	3,809	7,613
Total	4,384	2,468	6,978	13,830

TABLE M.—*Statement showing mails received from and dispatched to Philippine offices by the Manila post-office during the fiscal year ending June 30, 1902.*

(RECEIVED.)

Date.	Cavite and Manila and Dagupan R. P. O.		Other Philippine offices.		
	Number of pouches.	Number of sacks.	Number of mails.	Number of pouches.	Number of sacks.
1901.					
July	120	158	133	196	175
August	122	183	118	190	172
September	119	176	115	183	146
October	130	207	132	204	226
November	127	200	193	273	364
December	122	147	192	267	298
1902.					
January	128	181	187	258	270
February	112	148	184	239	332
March	134	145	201	235	379
April	127	159	164	230	325
May	131	155	177	278	387
June	119	140	189	326	363
Total	1,491	1,999	1,985	2,879	3,437

(DISPATCHED.)

Date.	Number of pouches.	Number of sacks.	Number of mails.	Number of pouches.	Number of sacks.
1901.					
July	93	532	303	211	2,081
August	97	574	297	228	2,096
September	91	512	280	187	2,066
October	102	614	286	210	2,210
November	94	361	325	300	2,091
December	101	432	270	284	2,157
1902.					
January	104	459	248	293	2,543
February	86	290	232	240	1,801
March	113	278	261	271	1,860
April	101	357	186	238	2,227
May	122	576	213	345	2,498
June	99	308	205	365	1,612
Total	1,203	5,293	3,106	3,172	25,242

TABLE N.—*Statement of mails received from and dispatched to the United States on transports and on liners via Hongkong and Japan ports by the Manila post-office during the fiscal year ending June 30, 1902.*

Date.	Via—	Received.				Dispatched.			
		Number.	Pouches of letters.	Pouches of registers.	Sacks of papers.	Number.	Pouches of letters.	Pouches of registers.	Sacks of papers.
1901.									
July	Transport	1	43	39	512	3	67	102	167
Do	Liner	5	80	49	600	3	47	65	61
August	Transport	3	102	92	1,121	2	103	177	208
Do	Liner	7	35	14	204	2	31	....	46
September	Transport	3	112	147	1,604	2	60	79	122
Do	Liner	7	12	19	205	4	58	56	85
October	Transport	3	78	99	1,770	2	78	125	191
Do	Liner	4	....	....	5	2	32	....	11
November	Transport	1	37	56	526	2	66	199	246
Do	Liner	5	24	33	540	4	78	209	197
December	Transport	3	90	141	1,141	4	99	200	212
Do	Liner	6	18	47	338	2	15	14	27
1902.									
January	Transport	2	69	170	1,314	2	74	95	203
Do	Liner	6	35	69	631	2	49	70	70
February	Transport	1	18	64	543	3	95	171	256
Do	Liner	4	21	39	389	4	34	20	22
March	Transport	2	33	103	942	4	159	260	267
Do	Liner	4	....	....	7	1	13	....	18
April	Transport	4	72	207	2,307	2	108	189	285
Do	Liner	3	....	....	6	2	27	35	47
May	Transport	5	80	225	1,716	5	110	201	202
Do	Liner	5	9	1	197	2	24	26	38
June	Transport	2	23	71	638	4	128	171	212
Do	Liner	3	19	2	257	1	19	80	39
Total	....	89	1,010	1,687	17,513	64	1,574	2,544	3,232

TABLE O.—*Statement of mails received from, and dispatched to, Honolulu, Guam, and United States ships and troops in foreign ports by the Manila post-office during the fiscal year ending June 30, 1902.*

Date.	Honolulu.				Guam.				Ships and transports.	
	Received.		Dispatched.		Received.		Dispatched.			
	Number of mails.	Number of bags.	Number of mails.	Number of bags.	Number of mails.	Number of bags.	Number of mails.	Number of bags.	Number of bags received.	Number of bags dispatched.
1901.										
July	4	5	6	6	....	....	2	8	21	87
August	5	5	4	5	1	3	1	2	18	53
September	4	4	5	9	3	9	3	9	21	52
October	5	5	4	4	2	3	1	1	7	57
November	3	3	5	5	2	3	6	10	11	63
December	5	5	6	6	2	4	6	6	12	55
1902.										
January	5	5	3	3	2	3	1	1	30	54
February	3	3	4	4	1	1	(a)	....	16	63
March	4	5	6	7	1	1	....	....	25	64
April	5	6	2	3	1	4	....	....	16	72
May	4	7	5	5	....	....	....	....	8	79
June	3	3	5	5	....	....	....	....	12	47
Total	50	56	55	62	15	31	20	37	197	746

[a] San Francisco, Cal., "dispatched," except steamer direct, accounts for no mail being dispatched direct.

TABLE P.—*Statement of mails received from and dispatched to foreign countries by the Manila post-office during the fiscal year ending June 30, 1902.*

Date.	Received.			Dispatched.				
	Number of mails.	Number of bags.	Gross weight.	Number of mails.	Number of bags.	Number of letters.	Netweight of letters.	Netweight of prints.
1901.			*Pounds.*				*Grams.*	*Grams.*
July	32	229	8,686	33	127	14,965	304,238	936,719
August	32	235	9,455	32	142	16,596	347,425	982,794
September	30	291	12,683	25	115	16,249	339,374	832,226
October	26	209	8,930	30	147	19,622	422,201	960,321
November	26	271	11,595	29	151	19,720	426,325	895,364
December	31	263	10,815	32	126	17,077	372,573	1,331,479
1902.								
January	35	285	11,991	33	109	18,399	387,034	780,979
February	29	198	7,050	37	123	22,225	408,809	1,014,5[illegible]5
March	35	347	14,747	31	107	19,109	385,252	789,34
April	32	242	9,266	27	139	18,636	352,898	946,80
May	29	286	11,425	34	146	20,731	409,628	1,091,99
June	30	230	11,345	24	122	17,923	342,622	848,22
Total	367	3,086	127,988	367	1,554	221,252	4,498,389	11,410,75

EXHIBIT I.

BUREAU OF COAST GUARD AND TRANSPORTATION—CAPTAIN OF THE PORT.

BUREAU OF COAST GUARD AND TRANSPORTATION,
Manila, P. I., September 30, 1902.

To the EXECUTIVE SECRETARY,
Manila, P. I.

SIR: I have the honor to make the following report to the governor on the work of this bureau since its establishment, October 17, 1901:

Under the provisions of the act establishing the bureau of coast guard and transportation, the civil governor appointed the captain of the port of Manila as chief of the bureau of coast guard and transportation, and up to March 1, 1902, the clerical force of the captain of the port's office performed the work of the bureau of coast guard and transportation. On March 1 the bureau started its own clerical force, appointing only as many as were needed at the time; since then the force has been increased, but it is still not up to the full complement, and will not be until January 1, 1903.

On January 26, 1902, Lieut. Commander J. C. Fremont, U. S. Navy, was confirmed as superintendent of the construction and maintenance of vessels; on March 13, Lieut. Commander J. M. Helm, U. S. Navy, was confirmed as superintendent of the light-house service; and on March 24, Capt. Henry Jervey, U. S. Army, was confirmed as superintendent of light-house construction. Lieut. Commander Fremont was detached from duty in this bureau on September 4, and no one has been ordered to take his place so far.

TRANSPORTATION SERVICE.

The principal work of the bureau in the transportation service has been the designing, construction, and supervision of construction of 15 composite steamers; 10 of them single screw, 148 feet long, now being built at Shanghai, China, by S. C. Farnham Boyd & Co., and the other 5 twin screw, 140 feet long, now being built at Uraga, Japan, by the Uraga Dock Company. At present the stages of completion of these vessels are as follows: Cutter No. 1, completed, on duty; No. 2, completed, on duty; No. 3, 65 per cent completed; No. 4, 90 per cent completed; No. 5, 90 per cent completed; No. 6, 80 per cent completed; No. 7, 65 per cent completed; No. 8, 65 per cent completed; No. 9, 80 per cent completed; No. 10, 90 per cent completed; No. 11, 55 per cent completed; No. 12, 55 per cent completed; No. 13, 50 per cent completed; No. 14, 50 per cent completed; No. 15, 50 per cent completed. The full speed of the above vessels, without forced draft, is to be 10 knots, and they will carry at least twelve days' coal for steaming at an economical speed, which will be about 8 knots. Each of the single-screw vessels is to be armed with two 1-pounder Hotchkiss rapid-firing guns, and each of the twin-screw vessels is to be armed with two Gatling guns. An electric plant will be installed in each vessel, and they will carry a searchlight of 18 inches diameter; also an evaporator of sufficient capacity for distilling sufficient drinking water for everyone on board.

Two of the vessels have already been delivered at Manila, and are satisfactory in every way. The *Negros*, cutter No. 2, arrived September 13; and the *Luzon*, cutter No. 1, on the trial trip, made, on natural draft for nine hours, a speed of 11.57 knots per hour, which is far above the contract speed. The *Negros* made a run similar to that of the *Luzon*, and the working of her engines showed she was in every way equal to the *Luzon*, but on account of a strong head wind and a heavy sea her speed was about half a knot less. The *Luzon* arrived in Manila September 20.

I am glad to be able to state that these two vessels are pronounced, by all who have seen them, a success. Although only of 420 tons when loaded, they can carry enough coal in the bunkers to steam 2,300 miles; carry a cargo of 250 tons; have good quarters for the officers and crew and accommodation for 12 first-class passengers. Besides these, a number of other passengers can be carried on deck.

The further work of this bureau consisted in the purchase and necessary altering of five seagoing launches, two of which were detailed for service in the custom-house, and were on January 1, 1902, completely turned over to the custom-house. The cost of purchasing these vessels and maintaining them up to January 1, 1902, is charged to this bureau.

The three other launches were detailed as soon as they arrived and were fitted out for constabulary service and will continue to be a part of the fleet of this bureau. A river launch was also purchased and detailed for service under the constabulary.

In June, 1902, the twin-screw seagoing tug *Picket* was purchased in Shanghai and altered so as to be fitted for the work of a light-house tender. She arrived at Manila on August 7 and has since been doing that work. The cutter No. 5, nearly completed at Shanghai, will also be especially fitted for light-house and buoy work.

A stern-wheel steamer about 75 feet long and of very light draft was contracted for with S. C. Farnham, Boyd & Co., of Shanghai, China, and arrived September 30. It will be assembled at or near Aparri, and stationed in the Cagayan de Luzon River.

The two other boats, bay and river launches, were also turned over to the custom-house on March 1, 1902.

LIGHT-HOUSE SERVICE.

The first satisfactory inspection of all light-houses and stations in these islands was completed on May 30, 1902, when the superintendent of the light-house service and the superintendent of light-house construction made a complete tour of the islands, visiting all stations and at the same time investigating in regard to the necessary buoyage and light-houses to be constructed in the future.

Previous to this inspection the officer making the tour had command of the vessel and it was impossible for him to attend to both duties properly, as he frequently had to remain on board to care for his ship.

The reports show that a large amount of work is necessary to put the lights now established in proper condition. The first-order lights built by the Spaniards are excellent; in fact, the dwellings and towers are equal to any that we have in the United States, and are on a much more elaborate scale than is necessary, but they were found to be in such a state that minor repairs were urgently needed to preserve their good condition.

Many of the lights have never been completed, and although lights were established and are in working order the dwellings are incomplete. The necessity of early attention to this was at once recognized, not only to preserve the lights but also to make the stations efficient and habitable. It is estimated that to complete this will cost $200,000 and extend over a period of eighteen months more. This work was commenced at once.

NEW LIGHTS.

The subject of establishing new lights is being carefully considered, and as soon as a systematic plan has been decided upon it will be submitted to you and the necessary appropriation will be requested.

During the Spanish rule the only lights of any importance were the sea lights on the north and west coasts of Luzon, the lights around Iloilo and Cebu, and the light in San Bernardino Strait, on the east coast, and that on Cape Melville, in the southern part of the islands.

The great increase in trade, considerable of which is interisland, makes a number of new lights absolutely necessary. It is thought that with the modern idea of architecture the general system for new light stations should be iron framework for the towers instead of masonry. Such towers are strong enough to withstand typhoons and are probably better adapted to resist earthquakes. They are also less expensive and can be erected in a much shorter space of time.

During the past year the following lights have been established: Range lights and day marks at San Fernando de Union; light at Kananay Island, San Juanica Strait; temporary light at Jintontolo; harbor lights at Batangas, Lucena, Boac, Calapan, Taal, Balayan, Catbalogan, and Calbayog; lighted beacon at head of Pasig River.

The following work of repairs and construction has been done: Napindan beacon reerected and painted; Cape Engano Station extensively repaired and painted; Catbalogan, wooden skeleton tower erected.

Painting and repairs at the following stations: Cabra Island, Capones Islands, Linao, Point Santiago, Point Malabrigo, Gigantes, Manigonigo, Cape Mellville, Pulo Caballo, San Fernando, and Pasig River.

Fence erected at Corregidor Island.

The following work is in progress: Repair of dwellings and tower at Corregidor Island Station; assembling material and party for Bugui; erection of keeper's dwelling at Point Sangley.

Preparation of plans for raising light at Point Sangley, for beacons at Romblon, for light at Sorsogon Bay, for tower at Capitancillo Islet.

Cleaning and painting ironwork in depot for Jintololo, Capitancillo, and other incomplete stations.

Lanterns have been sent to Cuyo Island for the establishment of a new light station there.

BUOYAGE.

Regarding the subject of buoyage, the harbor of Cebu has been completely rebuoyed, and buoys in the harbor of Iloilo and Tacloban have been replaced, so as to occupy the best positions for navigation. Several new buoys have been established.

A shipment of buoys is expected from the United States, the moorings for which are already on hand, and as soon as they are received the subject of buoying all harbors and channels that require it will be taken up. The system of painting, marking, and numbering the buoys which is in use in the United States has been adopted in these islands.

A school of apprentices has been established at Manila, with Corregidor light-house as a training station.

The Marine Guards have been withdrawn from Malabrigo and San Bernardino, and the guards of soldiers from Capul, leaving only one light-house station under guard, this being at Cape Melville.

Statement of expenditures from October 1, 1901, to September 30, 1902.

Office salaries and wages	$6, 115. 02
Light-house service	52, 709. 58
Launches	96, 855. 60
Contingent expenses	5, 133. 04
Construction of vessels	435, 599. 49
Transportation	171. 29
Total	596, 584. 02

Respectfully,

A. Marix,
Commander, United States Navy, Chief of Bureau.

Office of the Captain of Port,
Manila, P. I., September 30, 1902.

To the Acting Executive Secretary,
Manila, P. I.

Sir: I have the honor to make to the governor the following report of the operations of this office for the year ending September 30, 1902:

From October 1, 1901, to February 6, 1902, at which time the customs administrative act became law, the work of this office continued the same as during the previous years of American occupation. Upon the passage of that act all work which was in any way connected with the custom-house was transferred to that Department, thereby retaining in this office the duties which are prescribed under section 5 of that act. These duties comprise those performed by officials in large seaports of the United States which relate to shipping and are not connected with the custom-house. The prescribed change was made during the month of February, and by the first of March it was completed. Five clerks were discharged from this office, and all others, except one of class 9, were transferred to the bureau of coast guard and transportation. Subsequently a harbor master and an inspector of hulls were allowed, the former position being given to Mr. W. M. Taylor, who had so ably performed these duties ever since the American occupation.

The inspector of boilers arrived on May 21, 1902, and the inspector of hulls is expected to arrive shortly from the United States. After both these officials have assumed their duties the work of inspecting vessels and boilers will become more systematic, and the payment of all fees for such inspections will cease.

Upon the passage of the customs administrative act the payment of fees for the appraisement of vessels and for estimating the cost for repairs ceased at once, thereby doing away with many payments by shipowners to which they were subjected during the Spanish régime, but which are not customary in the United States.

During the year there were held 309 inspections of hulls and 234 inspections of boilers and machinery.

The inspector of boilers and the inspector of hulls will also be made members of the board for the examination and licensing of engineers for the merchant marine, which examination I recommend take place the second and fourth Tuesday of every month.

It has also been recommended that two superintendents of the coast guard and transportation and the inspector of hulls constitute a board for the examination of masters and mates of seagoing vessels, the captain of the port of Manila being president ex officio of both boards; and that the examinations take place the first and third Tuesday of every month.

A violent typhoon occurred in the early part of October, 1901, and although of very short duration, was very severe. Timely warning was given to all vessels, and those in the Pasig River were distributed to the best advantage for safety, the result of which was that there was little damage done compared to previous typhoons.

On July 25 last a very severe typhoon was experienced, lasting two days, and doing considerable damage to the framework of the new bulkhead in course of construction behind the breakwater, and a slight amount of damage to the shipping in Manila Bay.

During the period of the cholera epidemic, at the request of the board of health, all launches and lighters were compelled to leave the river at 5 o'clock in the evening, and were not allowed to return before they had been inspected by a representative of the board of health. Although such work has never been attempted before, it was most thoroughly done, owing to the very able assistance rendered by the river and harbor police, who at all times have acted in unison with this office in a most reliable and energetic manner in their work.

There were issued during the year stated the following licenses, viz: Ten to masters, 12 to mates, and 9 to patrons.

In conclusion, I desire to state that the change has been most beneficial as far as this office is concerned, and I have no doubt that it has also greatly facilitated the entrances and the clearances of vessels, thereby benefiting trade.

I repeat my recommendations that a fire boat be supplied to this harbor.

Very respectfully,

A. Marix,
Commander, United States Navy, Captain of the Port.

Office of Captain of Port,
Manila, P. I., October 17, 1902.

Statement of collections made by Commander A. Marix, United States Navy, captain of the port of Manila, from October 1, 1901, to September 30, 1902.

Month.	Ballast.	Navigation books.	Fish coral licenses.	Masters and mates, licenses.	Total.
1901.					
October	$6.75	$4.00	$559.50	$21.00	$591.25
November	16.75	15.00	407.00	6.00	444.75
December	7.25	14.00	173.50	10.00	204.75
1902.					
January	9.89	7.86	167.10	15.00	199.85
February	6.67	13.00	15.40	12.00	47.07
March	4.29				4.29
April	8.37				8.37
May	5.06			5.00	10.06
June	5.50			8.00	13.50
July	3.81				3.81
August	3.40				3.40
September	2.11			35.00	37.11
Total	79.85	53.86	1,322.50	112.00	1,568.21

EXHIBIT K.

UNITED STATES COAST AND GEODETIC SURVEY.

TREASURY DEPARTMENT,
UNITED STATES COAST AND GEODETIC SURVEY SUBOFFICE,
Manila, P. I., September 10, 1902.

The SECRETARY OF COMMERCE AND POLICE,
Manila, P. I.

SIR: I have the honor to submit the following report of the progress of the work of the Coast and Geodetic Survey in the Philippine Islands from October 1, 1901 (the date of previous report), to the present time. The field work has comprised harbor and channel surveys, the determination of geographic positions, and more extended hydrographic and topographic surveys of the coast.

Harbor surveys have been made at Santa Cruz, Tabaco, Gubat, and Matnog, on the island of Luzon; Halsey Harbor, on the island of Culion, and at Cebu, and Romblon. These surveys have included triangulation, hydrographic survey of the water area, and topographic plane-table survey of the shore and immediate vicinity. Hydrographic surveys have been made in the vicinity of Manila and Cavite, and at San Fernando and Bolinao, on the west coast of Luzon. Topography and triangulation have been carried on in the vicinity of Sorsogon, Luzon.

Extended coast surveys, including triangulation, hydrography, and topography, have been carried on in San Bernardino Strait and its eastern approaches, along the coasts of Samar and Luzon; in the vicinity of Albay Gulf, including Rapurapu Pass, the northern portion of Port Sula to Tabaco Bay, and the south shore of Albay Gulf, joining the work in San Bernardino Strait, and in Ormoc Bay, Leyte. The triangulation and shore line of Lingayen Gulf, Luzon, have been completed. Triangulation and topography have been carried for about 15 miles to the eastward of Aparri, north coast of Luzon, and the outer anchorage at Aparri has been sounded out.

Tidal observations for use in the hydrographic work, and to furnish data for tide predictions, have been made at 19 stations. At Manila these observations are continuous throughout the year, and at several other points the records cover several months.

GEOGRAPHIC POSITIONS.

To establish base points for future surveys, astronomical observations for latitude and longitude have been made at the following points: Legaspi, Sorsogon, Pasacao, Luzon; Masbate; Capiz, Panay; Dumaguete, Negros; Catbalogan, Samar; Maasin, Leyte; Misamis and Zamboanga, Mindanao. The longitude determinations have been made by the telegraphic method, for which purpose the lines and cables of the Signal Corps have been used.

Magnetic observations have been made at 13 places, to supply the information required for the charts. Where practicable, true meridian lines have been laid out.

The above field work has been carried out under charge of the following chiefs of parties: J. J. Gilbert, assistant, general survey work with steamer *Pathfinder;* J. E. McGrath, assistant, astronomical determinations; H. C. Denson, assistant, general survey work, shore party; R. B. Derickson, assistant, general survey work with steamer *Research* (from May, 1902); H. W. Rhodes, assistant, general survey work with steamer *Research* (to May, 1902); H. C. Mitchell, aid, astronomical determinations; C. E. Morford, aid, general survey work, shore party; J. S. Hill, observer, astronomical determinations.

STEAMER PATHFINDER.

The United States Coast and Geodetic Survey steamer *Pathfinder* arrived at Manila in November, 1901, and has since been engaged in survey work in the Philippine

Islands, under the orders of the Superintendent at Washington. After making some important local surveys with this vessel an extended survey of San Bernardino Strait and its eastern approaches along the north coast of Samar and the southeast coast of Luzon was carried out. This work being on a somewhat exposed coast required a vessel of good capacity and equipment.

STEAMER RESEARCH.

This small steamer, which was purchased and adapted for survey work by the United States Philippine Commission, was placed in commission October 1, 1901, and has since been engaged on survey duty, working at a number of different points on the west coast of Luzon, on the southeast coast of Luzon, one harbor on Culion Island, and one harbor reconnoissance on Mindoro Island. This vessel has been operated with a native crew.

OFFICE WORK.

At the Manila suboffice of the survey the work of equipping and supplying the field parties has been carried on, preliminary computations have been made, charts have been prepared for publication by lithography in Manila, notice to mariners of new hydrographic information have been prepared and published, the compilation of revised sailing directions for the Philippine Islands has been undertaken and one part published, and information has been supplied in response to official and other requests. Valuable data has been received from the naval and military authorities, and from others.

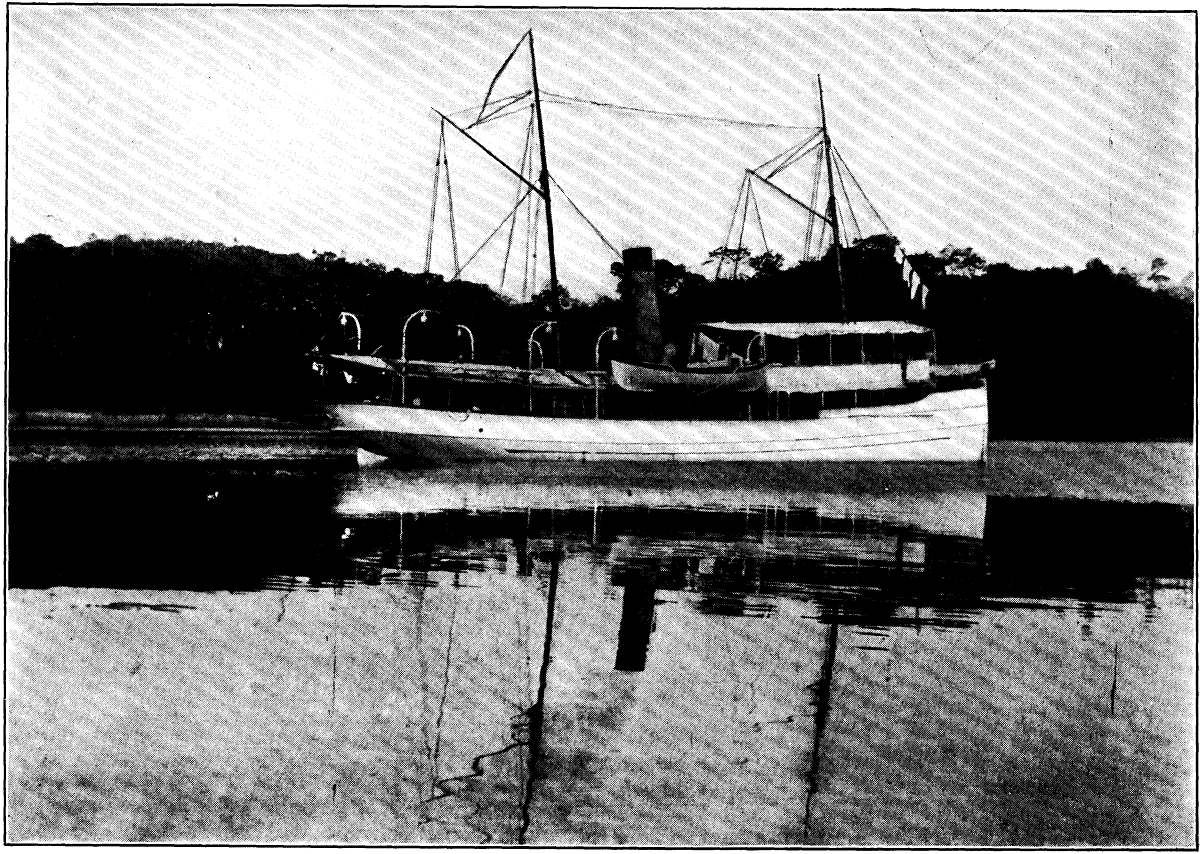
To make the results of field work available as early as possible the publication of charts in Manila has been continued, 15 charts having been published by lithography. The Filipino draftsmen have been found to do excellent work in this line. About 4,857 copies of charts have been distributed by sale or for official use from the Manila office during the period of this report and about 5,000 copies of notices to mariners have been sent out.

At present the computing work in the Manila office is in charge of E. R. Frisby, computer; the compilation of notices to mariners and sailing directions is in charge of J. C. Dow, nautical expert, and the drafting work is in charge of P. B. Castles, draftsman.

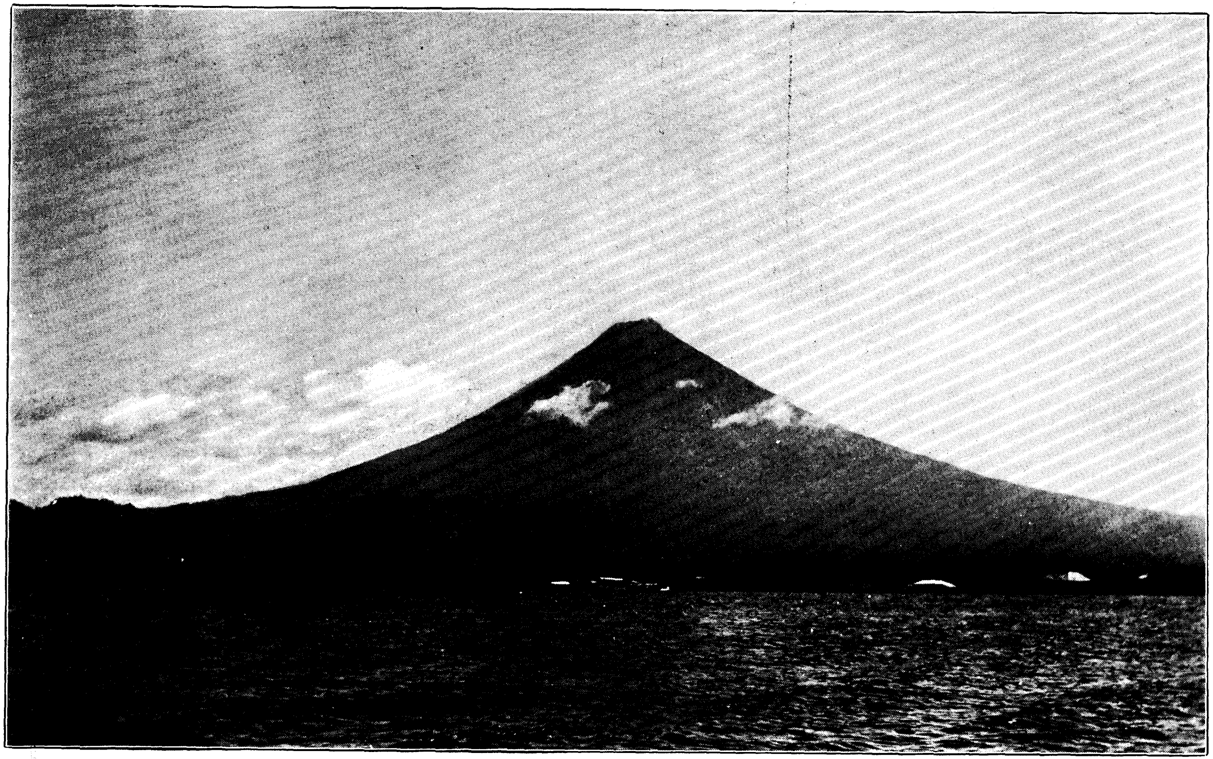
Until January 1, 1902, all the work, except the purchase and outfitting of the small steamer, was carried on under United States appropriations, but from that date there has been a division of expense, as authorized by a resolution of the United States Philippine Commission adopted September 27, 1901. The United States has paid the salaries of the field corps and experts detailed for this service, all expenses connected with the operation of the survey vessel sent to the Philippine Islands, the publication of charts in Manila, and has furnished instrumental outfit and some other supplies. The insular government has paid the other local office and field expenses, and the operating expenses of the small survey vessel.

While it has been possible to accomplish work at a number of places during the past year, to carry on this work systematically and effectively along a coast line as extensive as that of the Philippine Islands will require additional vessels of moderate size and specially suited for survey operations in these islands.

Very respectfully,
(Signed) G. R. Putnam,
Assistant, U. S. C. and G. Survey, in Charge Manila Suboffice.

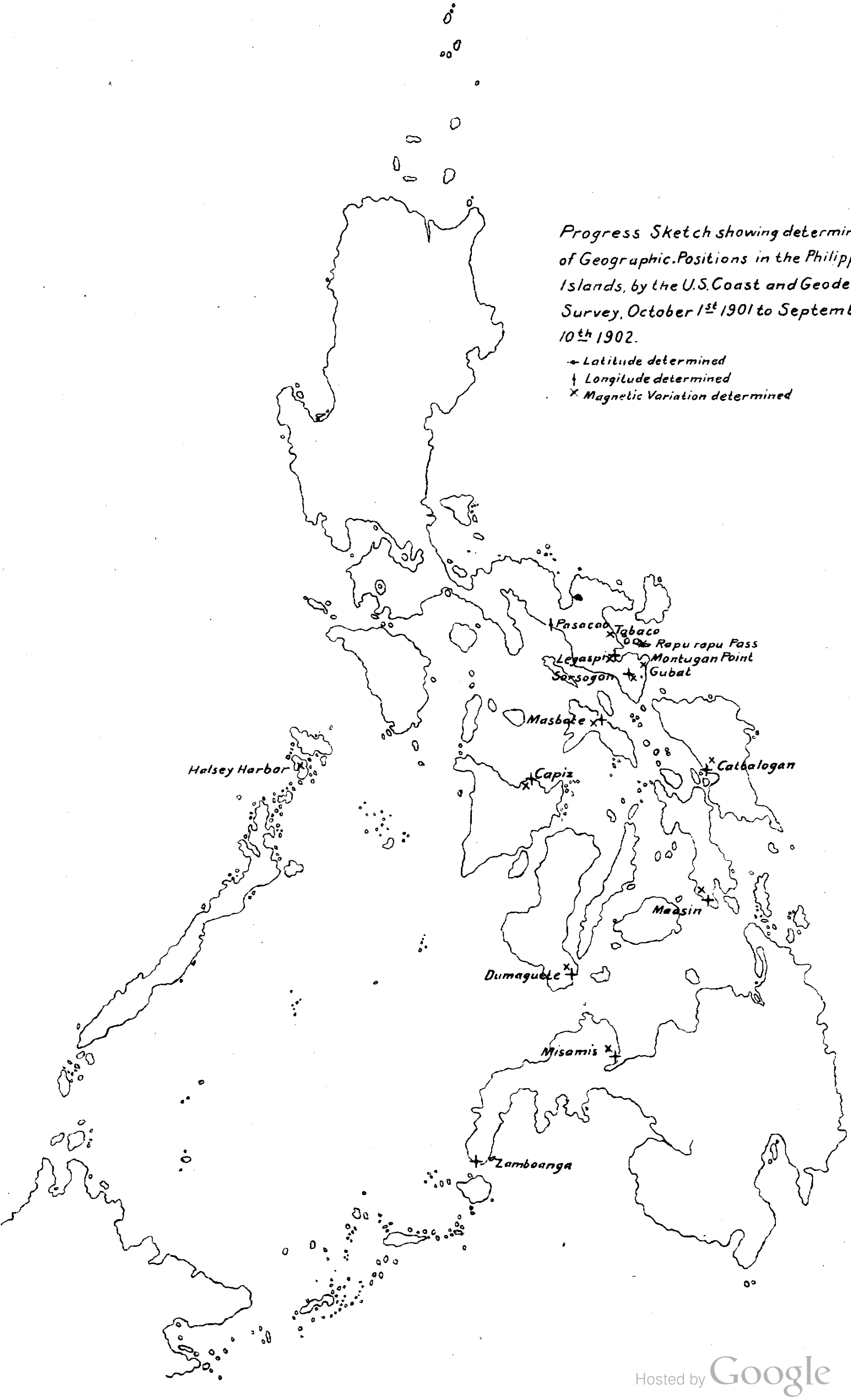


COAST AND GEODETIC SURVEY STEAMER RESEARCH.

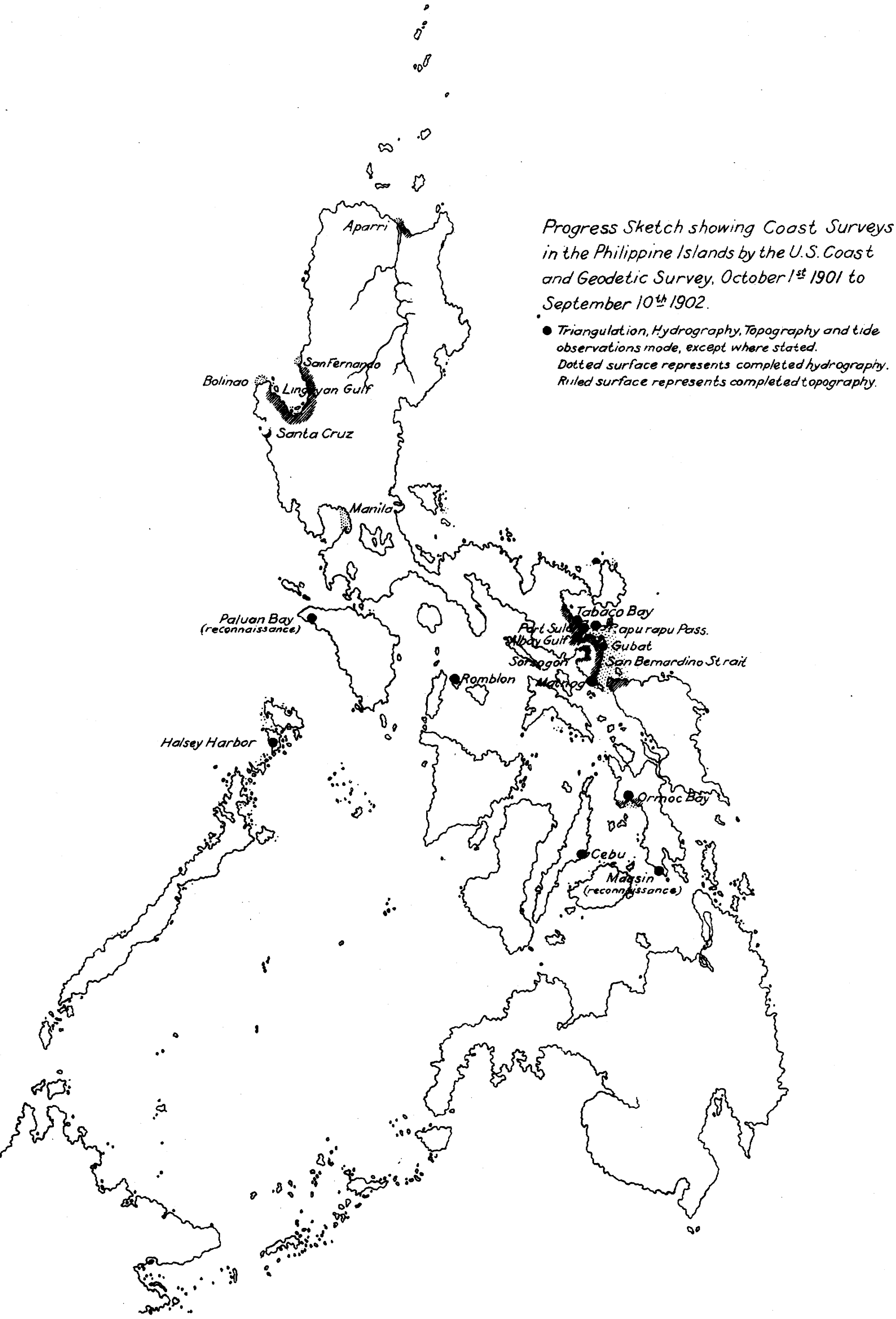


MAYON VOLCANO FROM TABACO BAY.

This is the most prominent landmark in southern Luzon, and its position and elevation, 7,916 feet, have recently been determined.



Progress Sketch showing determination of Geographic Positions in the Philippine Islands, by the U.S. Coast and Geodetic Survey, October 1st 1901 to September 10th 1902.



Progress Sketch showing Coast Surveys in the Philippine Islands by the U.S. Coast and Geodetic Survey, October 1st 1901 to September 10th 1902.

● Triangulation, Hydrography, Topography and tide observations mode, except where stated.
Dotted surface represents completed hydrography.
Ruled surface represents completed topography.

EXHIBIT L.

IMPROVEMENT OF THE PORT OF MANILA.

OFFICE IMPROVEMENT OF THE PORT OF MANILA,
SANTA LUCIA BUILDING, MALECON DRIVE,
Manila, P. I., October, 15, 1902.

The CIVIL GOVERNOR, PHILIPPINE ISLANDS
(Through Chief Engineer Officer, Division of the Philippines),
Manila, P. I.

SIR: I have the honor herewith to submit my report for the year beginning October 1, 1901, and ending September 30, 1902, on the improvement of the port of Manila and the Pasig River.

These improvements are in progress under act 22, as amended by acts 101, 182, and 199, Philippine Commission.

They consist of four divisions: The improvement of the outer harbor or bay of Manila; the improvement of the Pasig River below the bridge of Spain, the bar at the entrance, the inner basin, and the canal connecting the latter with the river; the improvement of the upper Pasig River to the Laguna de Bay, and the building of a drawbridge across the Pasig River near its mouth, giving passage for steam and street cars, and other vehicles and foot passengers.

The first and fourth divisions have been under the immediate supervision of Mr. J. F. Case, assistant engineer.

The second and third divisions and the shops, dry dock, and marine ways have been under the immediate supervision of Mr. J. E. Ainsworth, assistant engineer.

Mr. H. L. Fischer has had charge of the office force, the books, accounts, etc., as chief clerk and cashier.

These gentlemen have discharged their duties with intelligence, zeal, and industry, and to my satisfaction.

FIRST DIVISION.

The project for this improvement is the completion of the present west breakwater, and its extension some 700 feet to the 30-foot contour in the bay; the extension of the east jetty about 750 feet; the building of a timber bulkhead, reenforced by stone riprap in front and behind, from the end of sea wall running east from the outer end of canal to the end of the east jetty as extended; the dredging of the outer harbor to a depth of 30 feet, mean low water, over the greater part of the area, and to a depth of 18 feet along, parallel, and next to the west breakwater from the 18-foot contour to the inner basin and in the inner basin; the dredged material to be filled in behind the bulkhead to the shore, to a grade of 7 feet above mean low water, creating an area of made ground amounting to about 150 acres.

CONDITION OF WORK SEPTEMBER 30, 1901.

No actual construction work had been commenced, though under the provisions of the above-mentioned acts proposals had been invited on March 1, 1901, for the improvement of the harbor, and on August 12 a contract had been entered into with the Atlantic, Gulf and Pacific Company providing for the completion of the breakwaters (east and west), the construction of a pile and timber bulkhead, the dredging of the harbor, and the filling in of the bay front behind the bulkhead with the dredged materials.

On August 15, under the provisions of act No. 199, proposals were invited for riprap filling in the pile and timber bulkhead, and on September 20 a supplementary contract was entered into with the Atlantic, Gulf and Pacific Company for this work.

Three million four hundred thousand feet board measure of carbolineated timber for the bulkhead had been ordered, by purchase in open market, all bids in response to advertisement having been rejected as being too high. Ten dollars United States currency per 1,000 feet board measure was thus saved, amounting to $34,000.

The contractors immediately ordered their plant from the United States and began preparations for their work.

Investigations relating to the bridge mentioned in act 22 of the United States Philippine Commission had also been undertaken.

PROGRESS DURING THE YEAR.

The months of October, November, and December, 1901, were occupied by the contractors in receiving and setting up their plant, including shops, offices, and quarters, and the opening and equipment of the Mariveles quarries.

The carbolineated lumber was delivered in November.

On January 13, 1902, actual construction of the bulkhead was commenced, with one floating and one land pile driver. The delivery of riprap stone commenced on March 22, the first load having been received on that date. Up to July 31, 1902, 2,613 linear feet of bulkhead was completed and estimated to the contractor, but of this amount 394 feet was destroyed by the typhoon of July 26 to 30. The wrecked portion was worked loose by the action of the waves and floated ashore, where it was sorted and piled with little loss to the component timbers. Bulkhead construction has been retarded in order to allow the riprap filling and protection to keep as close to the timber construction as possible.

Further construction of the bulkhead has been suspended since the storm, with a view to resuming after the typhoon season.

The east breakwater has been built up to low-water line and some rock has also been placed in the west breakwater.

To date the total quantities of rock delivered are: Bulkhead, 31,607.54 tons of 2,000 pounds; breakwaters, 12,018.83 tons of 2,240 pounds.

Construction of the new hydraulic dredge was commenced early in July and has been vigorously prosecuted. The steel hull is at this date 92 per cent completed.

The quarries are in good condition and the output would be largely increased were it not for the loss of two scows during the storm of July 26 to 30.

The contract required that the dredging should begin not later than April 1, 1902, and be completed in three years, as also the stone work. From present appearances the dredging plant will not be ready before January 1, 1903, but the contractors express great confidence in their ability to have the whole work completed on time.

SECOND DIVISION.

The project for this improvement is the deepening of the canal, the bar at the mouth of the Pasig, and the Pasig River, to 18 feet, mean low water, as far as the bridge of Spain, giving a bottom width of 250 feet.

CONDITION, SEPTEMBER 30, 1901.

A channel had been dredged from the mouth of the river to station 8, 250 feet wide, 18 feet deep (mean low water), and 800 feet long.

A channel 15 feet deep (mean low water) had been dredged from the 7-foot contour of the inner basin through the canal to the old wall to the entrance to the canal.

Dredge No. 2, one of the old Spanish dredges, had been overhauled and was at work dredging.

Dredge No. 1, also one of the old Spanish dredges, was being overhauled.

Tug *Manila* had been hauled out on marine railway and it was found necessary to rebuild the hull and boiler.

The launch *Oeste*, having been overhauled, was at work with dredge No. 2.

The launches *Norte* and *Diana* were on hand, in general use about the shops and with survey party.

There were on hand seven old dump scows, their capacity ranging from 68 to 124 cubic yards. The scows were all in very bad condition; they had been patched up so as to be used until new ones could be constructed.

Three new steel dump scows of 200 cubic yards capacity each were ordered of the Manila Slip Company, by purchase in open market, all bids received by advertising having been rejected as too high. The amount thus saved was $4,875 United States currency.

PROGRESS DURING THE YEAR ENDING SEPTEMBER 30, 1902.

A channel was dredged on the bar 300 feet wide, 4,000 feet long, 19 feet deep, mean low water.

A channel was dredged in the river from its mouth to station 38; also from station 40 to station 49, 350 feet wide, 19 feet deep, mean low water, and 4,800 feet long.

A total of 516,641 cubic yards of material was dredged during the year, at a cost of 8.4 cents per cubic yard. This cost of dredging includes the total expense of the plant except the first cost of the same to the insular government for repairs, and the cost of the launch *Malecon*.

The work of reenforcing and completing the canal and basin wall was nearly finished; the basin wall and the east canal wall were completed, 1,324 cubic yards of masonry having been laid, at a cost of $4,422.41.

The old wall at the river entrance to canal was partially removed, 1,021 cubic yards of masonry having been removed, at a cost of $1,300.26.

Dredge No. 1 was overhauled, new plating was placed on sides, new floor beams and new deck were placed, the machinery was overhauled, and dredge put to work in February, 1902.

Tug *Manila* was entirely rebuilt, except the engines.

Launch *Oeste* had about three-fourths of the plating renewed.

The *Malecon*, a new towboat, was bought in April, 1902.

The three steel dump scows ordered of the Manila Slip Company were received.

Material was bought and received for three new steel dump scows.

THIRD DIVISION.

The project for this improvement is the dredging out the bar or shoal places in the Pasig River above the Ayala bridge to the Laguna de Bay, to give a 6-foot navigation at low water.

UPPER PASIG RIVER.

The machinery for a 1¾-yard dipper dredge was bought in the United States, and received. The hull and three wooden dump scows of 200 cubic yards capacity each were constructed, and the machinery was partially set up.

In connection with the second and third divisions are the machine shops, dry dock and marine ways, used in the building and repair of dredges, launches, dump scows, water boats, floating derricks, and other plant.

DRY DOCK.

The dry dock was in use the entire year for docking our floating plant. We also docked 28 boats belonging to the United States Quartermaster's Department, the captain of the port, and the collector of customs.

FOURTH DIVISION.

The project for this improvement is the building of a through drawbridge over the Pasig River near its mouth, so as to interfere as little as possible with navigation, to give access from the city north of the Pasig River to the made land to be filled in under the first division. This bridge is to have a double-track railway, 2 wagon roads, and 2 foot walks.

It will consist of 2 fixed spans of 90 feet each, and 1 drawspan with 100 feet clear opening on each side of center pier, and approaches, the railroad approaches having grades of 3 per cent and the wagon road and sidewalk approaches grades of 7 per cent.

The superstructure will be of bridge steel, resting on 3 concrete masonry piers and 2 abutment piers. The streets and sidewalks along the Pasig River on both sides will pass under the approaches through arched passages.

CONDITION SEPTEMBER 30, 1901.

Investigations with respect to types of structures applicable to needs of the situation had been undertaken and were being prosecuted.

PROGRESS DURING THE YEAR.

The investigations mentioned were completed and the report of the assistant engineer rendered early in January, 1902.

Three designs were at once prepared, with the necessary strain sheets and estimates. The design selected for adoption, of a two-truss railroad with double cantilevered roadways and sidewalks was then elaborated, and strain sheets, estimates, necessary details, foundation plans, and specifications prepared.

Borings were made in the river to a maximum depth of 72 feet, determining the nature of the underlying strata, and from this data the foundation plans were designed and specimen cores tabulated. These borings indicate that there will be no special engineering difficulties in securing safe foundations at reasonable cost.

General Remarks.

The inauguration and execution of great public works, requiring the use of large and varied plants in the Philippine Islands, is attended with many difficulties and vexatious delays, owing to the scarcity of both skilled and common labor, the very restricted local market for machine supplies, exorbitant prices charged by private firms for machine work, and the great distance from home market.

Considering these unfavorable conditions, with which the contractors for the harbor work have had to contend, and also the delays and interference due to quarantine against cholera, they have made very fair progress, and it is hoped they will complete their contract in time.

The work done directly by this office has had the same conditions to contend with, handicapped by coming into possession of a great amount of second-hand plant, formerly the property of the Spanish Government, which plant was too good to throw away, and yet very expensive to put into proper repair. Had the element of time not been an important one it would have been better to have bought, or built, an entirely new plant. As it is, however, some immediate relief has been given to navigation by the dredging of the bar and the lower Pasig, and this part of the general project will soon be completed, as far as the first clearing out is concerned. It will be necessary, however, to do some dredging every year, to remove the annual fill brought down by the Pasig River.

The river work has been much delayed and interfered with and made more expensive by the congested condition of the river, and the want of legislation regulating the anchoring and mooring of vessels and preventing their obstructing the working of the government plant.

The problem connected with the improvement of the upper river is a difficult one, owing to the want of proper places for dumping the dredged material within economical distances, the bay being too far off and the lake too shallow.

As there was no dredge of suitable capacity which could be passed under the bridges, and as there would probably in the near future be sufficient dredging work in the upper river and around the Laguna de Bay to wear out one good plant, it was thought advisable to build such a plant, completing it above the bridges, where it would have to remain until worn-out.

This proposition having been approved by the civil governor, the necessary machinery, with duplicate parts specially subject to breakage and wear, was immediately ordered to be built by the Bucyrus Dredge Company, of South Milwaukee, Wis., and shipped out. Awaiting its arrival the hull of the dredge was built here and three dump scows, and another tug, the *Malecon*, was purchased. The machinery was promptly built, shipped, and delivered, and is now being set up. To meet the dumping difficulty it is proposed to build a hydraulic-dredge plant, to work in connection with the other plant, and deliver the dredged material on the banks of the river, sufficiently far back to avoid being washed back into the river. For this purpose a 12-inch centrifugal pump with suction, force pump, launder pipes, etc., has been ordered from the United States. The boiler, engine, and scow for carrying the outfit are on hand. The plant, therefore, will consist of one dipper dredge, three dump scows, a hydraulic dredge, and the tugs *Malecon* and *Norte*. With this outfit much good and rapid work can be done, but owing to the conditions mentioned, at a much greater expense than usually attends this kind of work. It is expected that this plant will be at work by the first of the next year.

With the completion of the general project, or even with that of the inner third of the bulkhead and filling behind it, the work will be in shape to begin a project for dockage of vessels by building piers and slips at right angles to the bulkhead and abutting thereon, the piers to be capable of future extension as the needs of commerce demand.

With the protection anticipated from the finishing of the west breakwater, vessels should be able to lie easily at these piers the greater part of the year.

Ultimately, however, another outer breakwater will be necessary to give complete security to vessels at all seasons and in all weathers. A study for such a breakwater is now being made.

Financial statement.

Authorized cost of approved general project		$3,000,000.00
Appropriated by act 22		1,000,000.00
Expended to September 30, 1902	$506,573.43	
Cash on hand and in bank	62,789.90	
Undrawn balance in treasury	430,636.67	
		1,000,000.00

CLASSIFIED EXPENDITURES.

Services, assistant engineers, surveyors, clerks, draftsmen, etc., and wages of mechanics, laborers, etc	$143,579.99
Material and supplies (timber, iron, etc.)	273,871.49
Services not personal	9,156.65
Atlantic, Gulf and Pacfic Company (contract)	79,965.30
Total	506,573.43

(Of this total, $62,888.39 was expended prior to September 30, 1901.)

Incurred liability (Atlantic, Gulf and Pacific Company, retained percentage of 10 per cent on contract work)	8,885.02
Miscellaneous receipts (use of dry dock, marine railway, sale of property) turned into the treasury	9,968.24

Respectfully submitted.

(Signed) Clinton B. Sears,
Major, Corps of Engineers, U. S. Army, in Charge.

EXHIBIT M.

CONSULTING ENGINEER.

Manila, P. I., October 18, 1902.

The honorable CIVIL GOVERNOR
OF THE PHILIPPINE ARCHIPELAGO.

SIR: I have the honor to submit the following report of operations under act No. 444, enacted August 7, 1902, creating the office of consulting engineer to the Commission.

The organization of a working force for this office has not been completed. There is an urgent need of several trained and experienced men to take charge of various proposed surveys, examinations, and works of construction.

Conditions now existing in the islands present numerous important problems in engineering, upon the solution of which in the near future depends in a large measure the development of the various resources of the islands, along industrial and commercial lines, and a more intimate knowledge on the part of the inhabitants of the practical purposes of the Government. In this report it will be possible to discuss only a few of the special problems which have arisen, and suggest the line along which their solution may be attained.

The general subject of improved transportation occupies a primary position. This especially includes highways, harbor improvements, and railroads. Extensive repairs and improvements to existing highways are being carried on throughout the provinces. The provincial boards, through their supervisors, have this matter directly in hand, except in the municipalities, where thirty days' notice must be given of the intentions of the provincial board to make needed repairs; in case this work is not started by the municipal council, work may be commenced under the regulations of act 443.

This work is handicapped by the financial conditions existing in many provinces, by losses of draft animals, and the unsettled condition of labor and the remoteness from an adequate base of supplies. Its importance for mail routes, for the economical placing of agricultural products in the markets, and for the introduction of improved tools and methods of work throughout the agricultural regions can not be overestimated. It will require a long period to accomplish all that is required. Organization of this work on systematic and comprehensive line bases has been commenced.

In the greater number of the harbors the method of loading and discharging cargoes is expensive and of the most primitive nature. Extensive harbor improvements and the canalization of some of the principal rivers for commercial purposes is of large importance. Surveys have been made of some of the principal harbors, and plans for the improvement of same are now under way.

The importance of railroads to serve the interior of the larger islands and to afford rapid and economical communication with the seaports has received some consideration.

Of the 39 provinces established, 31 are provided with supervisors. There will be a tendency to increase this need of supervisors on account of transfers and from other causes. In general these officers are selected from men trained and experienced in engineering. Their duties are varied, and with the exception of the construction of highways they have been able to give little attention to the general engineering problems in their respective provinces. The question of organizing the engineering work of the supervisors on systematic lines has been started.

The control and improvement of rivers is a serious and extensive problem. Heavy losses have been incurred by the damage to growing crops and the destruction of arable land. These conditions exist principally in the lowlands. Improvement of the upper stretches of the rivers may endanger property adjacent to the lower portions.

The fertilizing effect of a moderate overflow is noticeable. The torrential effects of excessive rainfalls endanger all ordinary methods of protection. The problem presented requires comprehensive consideration. Investigations for river improvements and protection against floods in certain localities are now under way.

Individual ability and capacity are dependent upon health, wholesome food, pure air, and pure water. Many of the cities are located on ground within the effect of tidal action. The wells are shallow, with few exceptions. The possibility for surface drainage is slight. Efficient sewer systems do not exist. Numerous problems in providing pure water and a proper drainage system and in furnishing a condition which will render enteric epidemics possible of control are presented. Some data are being collected on driven and artesian wells to meet the need of pure water supplies.

The above are a few of the more important subjects now requiring the attention of this office.

Very respectfully,

J. W. Beardsley,
Consulting Engineer to the Commission.

EXHIBIT N.

NATIVE LABOR.

MANILA ORDNANCE DEPOT,
OFFICE OF CHIEF ORDNANCE OFFICER,
DIVISION OF THE PHILIPPINES,
Manila, P, I., November 12, 1902.

THE ADJUTANT-GENERAL
Division of the Philippines, Manila, P. I.

SIR: In compliance with indorsement from your office of November 4, 1902, on letter from the civil governor as to native labor employed at this depot, I have the honor to submit the following report:

1. Number of laborers, 95.
2. Not classified, but performing different kinds of work, some in handling stores and general outdoor labor, some cleaning leather goods, some cleaning arms, and some acting as helpers to the skilled laborers.
3. See answer to No. 2.
4. Skilled labor employed and classified as follows: Saddlers, carpenters, painters, engineers, armorers, machinists, blacksmiths, tinners, molders, masons, storehouse assistants, foremen of laborers.
5. Wages paid are as follows, in United States currency:

Laborers, at 40 cents per day	95
Saddlers, 1 at 80, 5 at 64, 1 at 56, 2 at 50, 2 at 48 cents per day, according to ability	11
Carpenters, 1 at $1.25, 2 at $1, 2 at 88, 5 at 80, 17 at 64, 1 at 48 cents, according to ability	28
Painters, 1 at 80, 1 at 64 cents, according to ability	2
Engineers, 1 at 80, 1 at 50 cents, according to ability	2
Armorers, 1 at $1, 6 at 80, 1 at 72, 5 at 64, 14 at 50 cents per day, according to ability	27
Machinists, 1 at $1, 4 at 80, 1 at 64, 1 at 50 cents per day, according to ability	7
Blacksmiths, 1 at $1, 1 at 80, 2 at 50 cents per day, according to ability	4
Tinners, 1 at 88, 1 at 80, 2 at 64 cents per day, according to ability	4
Molders, 1 at $1, 1 at 50 cents per day	2
Storehouse assistants, at 50 cents per day	6
Storehouse assistant, at 80 cents per day	1
Foreman of laborers, at 80 cents per day	1
Janitor, at 48 cents per day	1
Total employed	191

6. Wages are paid at the end of each month.
7. No difficulty has been experienced in getting unskilled labor, but we have much trouble in getting skilled labor that we can use to advantage. In so far as is possible we endeavor to make skilled mechanics by teaching the unskilled, but the number with whom the effort is a success is small, as many seem either unable to advance beyond a low grade of work or do not care to make sufficient effort to obtain the increased pay.
8. Eight hours constitute a day's work.
9. The efficiency of their labor is a matter of the standard chosen. As compared with the labor employed at arsenals in the United States, it is not efficient. The cost of production is approximately the same, if anything a little higher here, and the greater part of our material is included at the cost price in the United States. The quality of the work is not so good, and there are considerable losses due to work that

must be rejected. The men are not systematic, rapid, or trustworthy as laborers, and it seems nearly impossible to teach them these qualities. The foremen, who are Americans, and the only Americans employed outside the offices, have instructions to inspect carefully every piece of work, however small and unimportant, before it leaves the shops, in addition to watching its progress as carefully as possible. There are not more than half a dozen natives employed that can be trusted to do alone and properly a piece of work with which they are familiar, and not one to whom it is safe to intrust anything having features new to him, however carefully he may be instructed. This does not mean that the work is always wrong—only that it is impossible to be sure that it will be right. Doubtless, as a result of long training, the necessity for really good work does not seem to be comprehensible to the majority of Filipinos at this depot, and if they make a mistake they seem to think it fully rectified by a patch, although several men have been discharged on this account. The time required to get anything done is a distinct disadvantage, and can not be fully covered by an increased number of workmen, since the number that can be employed on any one job is limited.

10. Three of the carpenters given in the list, in answer to question five, are Chinese, one at $1 per day and two at 88 cents per day. There were previously employed here, during a rush, some ten Chinese carpenters, and about a year and a half ago quite a gang of them were building a storehouse. At one time, the outside laborers were all Chinese. Of these latter, the foremen say that they were much better than the Filipinos, doing about one and one-third times the work for the same wages. On two occasions, however, when their services were badly needed, they went on a strike for higher wages. The carpenters who were working on the storehouse also struck for the same reason. As a consequence, Filipino labor was substituted, both in the outside gang and on the storehouse, although it is not believed that any money was saved thereby as compared with granting the request of the Chinese.

The Chinese that have been employed in the carpenter shop do better work than the Filipinos, and are cheaper at the higher price. The difference is about one-third in final result, but the watchfulness required for the Chinese is as nothing compared to that required for the Filipinos.

11. The records of this depot show that the average attendance during the year from November 1, 1901, to October 31, 1902, was 0.846 of the possible. The roll for October, 1902, shows 112 men who were on the roll for October, 1901, the latter having in all 221 names, giving 0.507 of the employees of October, 1901, still employed. The total number employed now is less than it was a year ago by 30 men, but the reduction has been made by not filling the places of men who quit or by the discharge of men who would not have been retained in any case, many for irregular attendance.

The percentage of absentees is greatest for two or three days after payment, and Monday is always marked by more absentees than usual. The percentage, however, is not large in either case.

Their physical strength for lifting and other heavy work is little more than one-half that of a Chinese cooly; their backs seem to be fairly strong, but their arms are weak.

An effort has been made to compare the prices paid at this depot with that paid by merchants, but the latter refused to give their rates. From the talk of the men, it is believed that we pay slightly less.

All the labor of this depot, except about twelve men, has been under my personal supervision for sixteen months, and in that time, considering only the quality of the work, not its quantity, I have found not more than twelve men who would be classed above the grade of helper in an arsenal in the United States, and six of those twelve would be classed in the lowest grade of skilled labor, of which there are four or five; the other six might get into one grade higher. If the quantity of work also be considered, they would be excluded altogether. This last feature should not properly be considered, as the wages paid here are so much lower than in the United States.

Respectfully,

J. H. Rice,
Lieutenant, Ordnance Department, U. S. Army,
Commanding, Absence Chief Ordnance Officer.

REPORT OF THE SECRETARY OF THE INTERIOR TO THE PHILIPPINE COMMISSION FOR THE YEAR ENDING AUGUST 31, 1902.

REPORT OF THE SECRETARY OF THE INTERIOR.

Department of the Interior,
Manila, P. I., November 1, 1902.

The Philippine Commission,
Manila, P. I.

Gentlemen: I have the honor to present my first annual report, which, unless otherwise expressly stated, covers the year ending August 31, 1902.

Act No. 222, providing for the organization of the departments of the interior, commerce and police, finance and justice, and public instruction, enacted September 6, 1901, placed within the executive control of the department of the interior, the bureau of public health, the quarantine service of the marine-hospital corps, the bureau of forestry, the bureau of mining, a bureau of agriculture, a bureau of fisheries, the weather bureau, a bureau of Pagan and Mohammedan tribes, the bureau of public lands, the bureau of government laboratories, and the bureau of patents and copyrights.

The bureau of health, the quarantine service of the marine-hospital corps, the bureau of forestry, the bureau of mining, the weather bureau, the bureau of public lands, the bureau of government laboratories, and the bureau of patents and copyrights, were organized prior to the passage of act No. 222. The bureau of agriculture and the bureau of non-Christian tribes have since been organized.

There have also been established within the past year a civil hospital at Manila and a civil sanitarium at Baguio, Benguet, for the treatment of civil officers, employees, and members of their families. Both of these institutions are under the executive control of the department of the interior, as is the board of medical examiners provided for by act No. 310.

THE BOARD OF HEALTH FOR THE PHILIPPINE ISLANDS AND THE CITY OF MANILA.

A heavy burden of work has rested upon the insular board of health from the time of its organization. The board consists of a commissioner of public health, a sanitary engineer, a chief health inspector, a secretary, and ex officio the superintendent of government laboratories.

Lieut. Col. L. M. Maus, deputy surgeon-general, U. S. Army, was detailed as commissioner of public health on July 26, 1901; Maj. Franklin A. Meacham was appointed chief health inspector August 9, 1901; Dr. Paul C. Freer entered upon the discharge of his duties as superintendent of government laboratories August 9, 1901; Dr. Manuel Gomez was appointed secretary of the board August 9, 1901; Capt. C. W. Mead, city engineer of Manila, was by virtue of his position the sanitary engineer of the board from the date of its organization. With the exception of Dr. Meacham, who had been a member of the board of health of Manila organized under the military government, while serving as major and chief surgeon, U. S. Volunteers, these gentlemen were all new to their duties. Major Meacham resigned from the army to accept appointment as chief health inspector.

LEGISLATION RECOMMENDED BY THE BOARD.

Act No. 157 requires the insular board of health to draft and recommend to the central legislative body of the islands suitable sanitary laws. In compliance with this act the board has within the past year drafted and recommended to the Commission: "An act regulating the practice of medicine and surgery in the Philippine Islands;" "An act regulating the practice of pharmacy in the Philippine Islands;" "An act regulating the practice of dentistry in the Philippine Islands;" "An act regulating the practice of veterinary medicine, surgery, and dentistry in the Philippine Islands;" "An act providing for the establishment of provincial boards of health, and fixing their powers and duties;" "An act providing for the establishment of municipal boards of health, and fixing their powers and duties;" "An act providing for the compulsory vaccination of the inhabitants of the Philippine Islands;" "An act providing for the control and suppression of leprosy in the Philippine Islands;" "An act regulating the manufacture, sale, and other disposition of alcoholic beverages in the Philippine Islands," and "An act transferring the employees of the board of health of the city of Manila under the provost-marshal-general to the board of health for the Philippine Islands."

The presence of bubonic plague in the city of Manila made it important that there should be no lapse in the health work upon the turning over of the city government to the civil authorities, and the first of these measures to be considered and adopted in modified form by the Commission was that providing for transferring the old employees of the board of health of Manila en masse to the insular board of health.

An act providing for the interment or burning of the bodies of animals which die having rinderpest, and prohibiting the sale or use of any part thereof, was enacted October 11, 1901.

ORGANIZATION OF PROVINCIAL AND MUNICIPAL BOARDS OF HEALTH.

The next necessity was deemed to be adequate provision for the extension of the public health service to the several provinces and municipalities of this archipelago. The establishment of provincial boards of health was provided for by act No. 307, enacted on December 2, 1901, and that of municipal boards of health by act No. 308, enacted upon the same date.

A provincial board of health consists of a president, who must be a duly qualified physician, the president of the municipal board of health for the capital of the province, and the provincial supervisor, who is required by law to be a civil engineer. The provincial secretary acts as secretary for the board, and the senior medical officer of the Army or Navy of the United States on duty at the capital of the province is an honorary and consulting member, but is not entitled to vote. The legal adviser of the board is the provincial fiscal. The only burden imposed upon the treasury of a province by the establishment of a provincial board of health is the salary of its president.

A municipal board of health consists of a president, who must be a duly qualified physician or an undergraduate of medicine, a member chosen by a majority vote of the municipal council, a male schoolteacher of the municipality appointed by the division superintendent of public instruction for the division in which the municipality is situated, the municipal secretary ex officio, and a pharmacist, if there be one resident within the municipality, who is appointed an honorary member of the board by the municipal president. The senior medical officer of the Army or Navy of the United States, if there be any on duty in the municipality, is an honorary and consulting member of the board. The municipal secretary, the pharmacist member, and the military or naval member are not entitled to vote.

Presidents of provincial boards of health are appointed by the civil governor, by and with the consent of the Commission. Presidents of municipal boards of health are appointed by the commissioner of public health upon the recommendation of the provincial board of health. Municipal boards of health are subordinate to provincial boards of health, which in their turn are subordinate to the board of health for the Philippine Islands.

The time for the organization of a board of health in any given province is determined by recommendation of the insular board of health, subject to the approval of the Secretary of the Interior. Municipal boards of health are organized at such time as the provincial board of health for the province in which such municipalities are situated directs and the provincial board (consisting of the provincial governor, the provincial treasurer, and the provincial supervisor) approves.

Grave difficulties have been encountered in putting into effect this theoretically simple system, from the fact that in many of the municipalities there is no person fitted by education to be the president of a municipal board of health. In fact, it has been far from easy to secure a sufficient number of competent physicians to act as presidents of provincial boards of health.

The outbreak of cholera made it necessary to extend the organization of the public health service to provinces and municipalities much more rapidly than was originally contemplated. Provincial boards of health have been established in all the provinces except Marinduque, Masbate, Abra, Lepanto-Bontoc, and Benguet. Municipal boards of health have been established in 331 of the 883 organized municipalities of the provinces.

The presence of smallpox at a number of points in the archipelago attracted attention to the subject of vaccination, and led to the adoption of an act providing for the compulsory vaccination of the inhabitants of the Philippine Islands, on December 2, 1901.

The receipt of numerous complaints that persons without adequate medical education were engaging in the practice of medicine led to the adoption on December 4, 1901, of an act regulating the practice of medicine and surgery in the Philippine Islands.

The other legislative measures recommended by the insular board of health have not yet been considered by the Commission.

SERUM AND VACCINE INSTITUTES.

The urgent necessity for the production of large quantities of vaccine virus and of antiplague and antirinderpestic serums led to the establishment, under the board of health, of an institute for the production of vaccine virus and of serums at Manila, and of a vaccine institute at Iloilo. It has been found advisable to abandon the latter institute, as experience has demonstrated the practicability of shipping vaccine virus on ice to all coast points in the archipelago without serious danger of deterioration. A considerable amount of antipestic serum was also produced, but the outbreak of cholera made it necessary temporarily to detail Dr. J. W. Jobling, director of the Serum Institute, for work in the Manila cholera hospitals, where he rendered invaluable service. Unfortunately, he broke down physically under the long-continued strain, and was granted leave of absence for recuperation in Japan. The work of the institute was, however, continued by Dr. Paul C. Freer, superintendent of government laboratories, and Dr. Richard P. Strong, director of the biological laboratory, as soon as cholera decreased sufficiently at Manila to relieve them of unusual demands upon their time. At present antirinderpestic serum is being successfully manufactured in quantities sufficient to immunize all cattle imported at Manila, and it is hoped soon to increase the output so as to enable the insular board of health to immunize all cattle in the vicinity of infected areas throughout the archipelago.

CONTAGIOUS DISEASE HOSPITAL.

The commissioner of public health, by virtue of his office, exercises direct control over all hospitals for contagious diseases. He has exercised such control during the past year over the following institutions: The San Lazaro Hospital, for lepers and for persons suffering from venereal disease; a plague hospital, a smallpox hospital, and three cholera hospitals, all in the city of Manila; and the leper hospital at Palestina, in the province of Ambos Camarines.

The commissioner of public health was further directed to proceed to Cebu and assume control over the leper hospital at that place, but the appearance of Asiatic cholera, when he was about to sail, led to the withdrawal of these instructions, which have not been renewed, as a plan for the segregation and care of all lepers in the archipelago upon the island of Culion is ready for submission to the Commission.

SPECIAL WORK OF THE BOARD IN MANILA.

The insular board of health acts as the health board for Manila. In this capacity it has recommended to the municipal board many health ordinances, nearly all of which have been adopted. The lack of a sewer system or of any adequate means for the disposal of human excreta is a standing and serious menace to the public health of Manila. By direction of the Commission, the board of health has taken upon itself the disposition of the night soil of the city, so far as this can be collected with existing facilities, and it has perfected plans for the introduction of the so-called "pail conservancy system." Adequate appropriation has been made by the Commission for initiating the installation of this system, which has begun and is progressing favorably.

An immense amount of sanitary work has been done by the board and its employees. Many of the worst districts of the city have been thoroughly cleaned and a strict inspection of the buildings of the city has been maintained.

EPIDEMICS.

The insular board of health has been subjected to a severe and long continued strain by the presence of bubonic plague in the city of Manila at the time of its organization, and by the cholera epidemic which began at Manila on March 20, 1902.

(A) BUBONIC PLAGUE.

Bubonic plague was discovered at Manila December 26, 1899, and slowly but steadily increased up to December, 1901, as will appear from the following table:

Months.	Cases.		
	1900.	1901.	1902.
January	18	7	
February	48	27	1
March	64	63	2
April	54	111	
May	22	137	
June	19	35	
July	13	39	
August	18	34	
September	6	8	
October	7	8	
November	1		
December	1	2	
Total	271	471	3

The deaths in 1900 numbered 199, and in 1901 reached a total of 432. The disease was at its worst each year during the hot, dry months of March, April, and May, nearly or quite disappearing during September, October, November, and December. It will be noted that the number of cases in 1901 exceeded that in 1900 by 200, while the number of deaths was about two and a half times as great, and the percentage of mortality among persons attacked increased from 73.4 in 1900 to 91.7 in 1901.

This heavy increase in plague for the year 1901 justified the apprehension that a severe epidemic would occur in 1902. Strenuous efforts were made to improve the general sanitary condition of the city, but the habits of the Chinese residents and the lower class of Filipinos were such as to render the enforcement of proper sanitary regulations well-nigh impossible.

On account of the important part which house rats are known to play in the distribution of bubonic plague, a systematic campaign was inaugurated against these rodents in Manila. Policemen, sanitary inspectors, and specially appointed rat catchers were furnished with traps and poison, and both traps and poison were distributed to private individuals under proper restrictions. A bounty was paid for all rats turned over to the health authorities, and stations were established at convenient points throughout the city where they could be received. Each rat was tagged with the street and number of the building or lot from which it came, was dropped into a strong antiseptic solution, and eventually sent to the Biological Laboratory, where it was subjected to a bacteriological examination for plague. During the first two weeks 1.8 per cent of the rats examined were found to be infected. This proportion steadily increased, reaching the alarming maximum of 2.3 per cent in October. At this time numerous rats were found dead of plague in the infected districts, and, in view of the fact that epidemics of plague among the rats of a city in the past have been uniformily followed by epidemics among human beings, the gravest apprehension was felt, the rapid spread of the disease among the rats after the weather had become comparatively dry being a particularly unfavorable symptom.

It was deemed necessary to prepare to deal with a severe epidemic, and a permanent detention camp, capable of accommodating 1,500 persons, was accordingly established on the grounds of the San Lazaro Hospital. Hoping against hope, the board of health redoubled its efforts to combat the disease. The force of sanitary inspectors was greatly increased, and under the able supervision of Dr. Meacham their work was brought to a high degree of efficiency. Frequent house-to-house inspections were made in all parts of the city where the disease was known to exist. The sick were removed to the hospital if practicable; otherwise they were cared for where found and the spread of infection guarded against.

Plague houses were thoroughly disinfected, and their owners were compelled, under the direction of the assistant sanitary engineer, to make necessary alterations. Cement ground floors were laid, double walls and double ceilings, affording a refuge for rats, were removed, defects in plumbing were remedied, whitewash was liberally used, and, in general, nothing was left undone that could render buildings where plague had occurred safe for human occupancy. Buildings incapable of thorough disinfection and renovation were destroyed. Buildings in which plague rats were taken were treated exactly as were those where the disease attacked the human occupants. The bacteriological examination of rats enabled the board of health to follow the pest into its most secret haunts and fight it there, and was, I believe, the most important factor in the winning of the great success which was ultimately achieved.

With very few exceptions, there was no recurrence of plague in buildings which had been disinfected and renovated. As center after center of infection was found and destroyed the percentage of diseased rats began to decrease, and in January, 1902, when, judging from the history of previous years, plague should have again begun to spread among human beings, there was not a single case. In February 1 case occurred. In March there were 2 cases, as against 63 in March of the preceding year, and before April the disease had completely disappeared.

This result, brought about at a time when the epidemic would, if unchecked, have reached its height for the year, marked the end of a fight begun by the board of health on the day of its organization and prosecuted unremittingly under adverse conditions for seven months with a degree of success which, so far as I know, has not been equaled under similar conditions in the history of bubonic plague.

Especial credit is due to Chief Health Inspector Meacham for the ingenuity which he displayed in devising means for the destruction of rats and for the tireless energy with which he devoted himself to securing their adoption, and to increasing the efficiency of his force of inspectors, as well as to Drs. J. W. Jobling and Edward A. Southall and their assistants, who worked unremittingly at the uncongenial and dangerous task of making a bacteriological examination of rats, a large proportion of which were putrid, while not a few of them were infected with one of the most fatal of diseases. This work was of necessity conducted in the inadequate building in which it has been necessary temporarily to house the bureau of Government laboratories, in close proximity to the civil hospital. The fact that not a single case of infection occurred among the laboratory force or the inmates of the hospital is sufficient commentary upon the care with which it was performed.

During 1901 plague appeared at several points in the provinces near Manila. Agents of the board of health were promptly dispatched to the infected municipalities and radical remedial measures were adopted, including in several instances the burning of infected buildings, the result being the complete disappearance of plague in the provinces as well as in Manila.

(*b*) THE CHOLERA EPIDEMIC.

On March 3, 1902, notification was received at Manila that Asiatic cholera had appeared at Canton, China, and on the 8th of March it was reported at Hongkong. As a considerable part of the green vegetables imported at Manila come from Canton and its vicinity, the United States quarantine officer at Hongkong was immediately notified that no vegetables not certified to by him would be admitted, and an order absolutely forbidding the importation of such vegetables was issued by the chief quarantine officer on March 19. Health inspectors were warned to be on the lookout for persons suffering from bowel trouble of a suspicious character.

On March 20 the board of health was advised that two patients at the San Juan de Dios Hospital were developing symptoms of Asiatic cholera. They were immediately visited by the commissioner of public health, the chief health inspector, the superintendent of Government laboratories, and by Dr. Strong, director of the biological laboratory, who took specimens of their dejecta for bacteriological examination. Cultures were at once prepared and the following morning the presence of a comma bacillus was demonstrated in hanging-drop slides. Two more suspicious cases had developed during the night. In the absence of the acting civil governor I communicated to General Chaffee the fact that four cases of suspected cholera had occurred, and requested him to have an adequate force in readiness to proceed to the Mariquina Valley and protect the city water supply.

On March 21 the characteristic "cholera red" reaction was secured from cultures. On March 22 Dr. Strong reported officially to the commissioner of public health the presence of Asiatic cholera. Meanwhile additional cases were occurring with increasing frequency. General Chaffee was informed of these facts and was requested to establish an armed patrol along the Mariquina River from the intake of the city water supply up to and beyond Montalban, the last town on the river. The distance from the intake to Montalban is about 12 miles, and the population inhabiting this part of the Mariquina Valley is estimated at 14,000. A considerable number of these people get their drinking water from the river, and a still larger number use it for bathing purposes and for washing soiled clothing. As many of the inhabitants are accustomed to make daily trips to Manila, the danger that they would take back cholera with them was manifestly great. In spite of a most stringent quarantine, cholera eventually broke out in the Mariquina Valley, but it was held closely in check, and, thanks to the efficiency of the river patrol, the water supply of Manila has been kept free from infection up to the present time. In achieving this well-nigh impossible result the army has made it possible to avert a general epidemic in Manila and has saved thousands of lives. The difficulties of the task can be appreciated only by those thoroughly familiar with the conditions which have been met, and the results accomplished bear eloquent testimony to the value of land quarantine.

CHOLERA WORK IN MANILA.

There are in Manila a large number of shallow wells in close proximity to water-closets and very likely to be infected by surface drainage. The board of health had been making detailed bacteriological examinations of these wells, condemning such as proved to be in a dangerous condition. Under the circumstances it was deemed necessary to abandon this slow procedure. All wells were ordered closed The work of closing them was pushed with great energy by Mr. J. L. Mudge, superintendent of city streets, parks, bridges, docks, and wharves, and as a result what subsequently proved one of the main sources of infection in many provincial towns was eliminated in Manila

As soon as cholera was definitely known to exist the officer in charge of the government ice plant was directed to increase the output of distilled water to the limit, and the use of all water which could be spared from the army distilling plant was secured. Transportation was obtained from the city as well as from the army, and water stations were established in the markets, on the water front, on the most crowded thoroughfares, and in those districts of the city where the absence of city water and the closing of wells seemed likely to cause hardship. Distilled water for drinking purposes was distributed free of charge. The Chinese used it liberally from the outset. The more ignorant of the Filipinos at first imagined that the health authorities were attempting to poison them, but their fears were soon allayed, and as the demand for distilled water increased it became necessary to send two perambulating water carts of large capacity about the streets.

It was soon noted that the disease was nearly confined to what is known as the Farola (light-house) district, included between the Bay of Manila, the north bank of the Pasig River, and a tide creek connecting the Pasig with the Bay, where an aggregation of overcrowded and filthy shacks presented conditions favorable to its spread. For several days a strong effort was made effectively to quarantine this district, but numerous persons escaped by water under cover of darkness. The conditions were such as to render thorough disinfection impossible. The disease spread rapidly among the imprisoned people and a continuation of the quarantine would have heen inhuman. I therefore ordered the inhabitants removed to the San Lazaro detention camp and the district burned over. The removal was effected on March 25. Houses and such personal property as could not be disinfected were invoiced on the 26th and burned on the 27th.

Cholera immediately developed in the detention camp, but the people confined there were kept under constant surveillance and those who began to sicken were immediately isolated, so that there was no spread of infection. The last case among the people of the Farola district occurred within forty-eight hours of their entering camp. They were ready to release five days thereafter.

For several days after the Farola district was burned there was a decided decrease in the number of cases of cholera, but the cases which did occur were widely scattered over the city, and investigation showed that in most instances the persons attacked had escaped from the Farola district while we were attempting to quarantine it. Cholera also began to develop in the municipalities about the bay, where it was carried by persons escaping from this district in small boats. I believe that if the measures finally resorted to had been taken three days sooner the epidemic might have been averted. Later experience in provincial towns has fully demonstrated the efficacy of radical measures if promptly adopted.

The disease was very malignant, more than 90 per cent of the early cases resulting fatally. General Chaffee was asked to furnish medical officers, and gave us every physician he could spare. The city was divided into twelve sanitary districts, each in charge of a medical officer with 30 to 60 men under him. The sale of fruits, vegetables, and foods likely to carry cholera was prohibited, and a rigid inspection established over markets, restaurants, and shops where articles of food were sold or consumed. House to house inspection was kept up day and night. All cholera cases discovered were removed to cholera hospitals if practicable, and contacts, if found, were taken to a detention camp. Cholera houses were quarantined until they could be disinfected. At first nipa shacks were burned in many instances. This practice provoked great hostility among the poorer people, and was later abandoned in favor of thorough disinfection.

Autopsies were made upon all supposed cholera victims in order that diagnosis might be certain and that the possibility of unjustly detaining persons as cholera contacts might be avoided. This dangerous work was performed by Dr. Richard P. Strong, Dr. J. W. Jobling, and Dr. J. B. Thomas, assisted by Mr. Norman Williams.

Relatives were allowed to claim their dead and bury them in quicklime, under the supervision of health officers, but bodies not claimed within twenty-four hours were cremated.

CHOLERA HOSPITALS AND DETENTION CAMPS.

Fortunately a well equipped permanent detention camp, capable of accommodating 1,500 people, had been constructed in anticipation of an epidemic of bubonic plague, and was available at the outset. The capacity of this camp was materially increased by the erection of tents furnished by the army. A detention hospital for the contacts who showed signs of illness, and a cholera hospital for those who developed cholera in the detention hospital or elsewhere in the city, were established in tents near the detention camp upon the San Lazaro estate.

Great difficulty was experienced in organizing a satisfactory cholera hospital and in securing competent physicians and nurses for it. Two physicians were tried and found wanting. Drs. J. W. Jobling and T. K. Hunt, who had orgrnized a very successful emergency hospital in the Farola district, were then put in charge, and proved to be admirable men for this trying and dangerous post. Surrounded by the dying and the dead, they worked unremittingly for the lives of their patients for eight weeks, relieving each other every twelve hours. At the expiration of this time they were both completely worn out, and it was necessary to vacate the hospital for thorough disinfection.

Male nurses were secured without difficulty and faithfully and courageously performed their duties. No female nurses could be obtained until March 28, when Miss Anna M. Seagran and Miss Marie A. Kolp volunteered. The following day Miss Elsie Weinberg also volunteered. The presence of these brave and efficient women was a blessing to the patients and resulted in greatly improving the condition of the hospital, which soon became as satisfactory as a tent hospital in the Tropics can be made. The strain to which every one connected with this hospital was subjected can be appreciated only by those who have seen Asiatic cholera at its worst. The last offices for the dying were necessarily performed by the physicians and nurses, as no minister of the gospel, Protestant or Catholic, ever visited the place.

Before the San Lazaro detention camp and cholera hospital became full a detention camp for persons desiring to leave Manila, a detention camp for cholera contacts, and a cholera hospital were established at Santa Mesa upon high ground, the use of which for this purpose was generously donated by Señor Juan M. Tuason. Here, as at San Lazaro, difficulty was at first experienced in getting a suitable man to take charge, but under the very able administration of Dr. Thomas R. Marshall work at the Santa Mesa camps and hospital was soon brought to a high degree of efficiency.

Meanwhile the Spanish residents had requested and received permission to establish a hospital where they might be cared for by their own physicians, under general supervision of the insular board of health, and had secured the spacious building formerly used by the army for the Second Reserve Hospital. They had expended a large sum in properly equipping this building, and a corps of Spanish physicians, friars, and sisters of charity was in attendance. This institution was named the Santiago Hospital.

As our cholera hospitals in tents were necessarily unsatisfactory, the commissioner of public health requested permission to use a considerable part of the Santiago Hospital, which afforded far more space than was required by the sick among the Spanish population. His request was promptly granted by the public-spirited gentlemen in charge; and this institution, which affords good accommodations for Spaniards, other Europeans, Filipinos, and Americans, with separate wards for the different nationalities and the two sexes, has been a most important factor in the saving of life. The building is large, cool, well ventilated, and easily disinfected. It stands at the center of a lot of some 29,000 square meters, inclosed by a high wall, and, although this lot is located in the populous district of Malate, the isolation of the building is complete.

OPPOSITION TO CHOLERA WORK IN MANILA.

As was to be anticipated, the rigorous measures against cholera enforced by the insular board of health provoked bitter opposition from the first. For weeks the presence of cholera was denied by ignorant, misinformed, and ill-intentioned persons. The more ignorant Filipinos refused to believe in its existence because the daily deaths did not reach up into the thousands. The minds of the common people were poisoned by tales of horrible abuses in the detention camps, and of deliberate murder of patients at the cholera hospitals. The story was widely circulated that the houses of the poor were burned in order to make room for the future dwellings and warehouses of rich Americans. These absurd tales gained credence among the populace, and, together with some actual abuses committed by ignorant, inexperienced, or overzealous health inspectors, produced a state of popular apprehension which proved a very serious factor in the situation, as it led to the concealment of the sick, the escape of contacts, and the throwing of dead bodies into the esteros and the Pasig River, the polluted waters of which were fruitful sources of infection.

Unfortunately the opposition was by no means confined to the more ignorant classes. At the outbreak of the epidemic a mass meeting of the Spanish and Filipino physicians was held. When asked whether they would cooperate with the board of health they, without exception, promised to do so. I regret, however, to record the fact that, with few exceptions, they not only failed to give active assistance, but in many instances, by neglecting to report cholera cases, by falsely reporting them, and by decrying the sanitary measures deemed necessary by the authorities, added materially to the crushing burden which rested upon the board of health. I take pleasure in calling attention to several noteworthy exceptions to this general rule. Dr. Ariston Bautista Lim, the ablest of the Filipino physicians of this capital, neglected his private practice and devoted much valuable time to assisting the insular board of health, both in the city and in the provinces. His services were invaluable. Dr. Manuel Gomez, secretary of the board of health, did a large amount of investigation and emergency work, and I desire to commend him and Dr. Luis Arbella, a chief medical inspector, not only for the efficiency with which they discharged the duties assigned them, but for their valuable services in helping to allay ungrounded popular apprehension.

When it became known that the Santiago Cholera Hospital was to be established I was visited by the heads of two important bureaus of the government, who presented petitions against my proposed action signed by numerous government officers and employees. Declining to accede to these petitions, I was later threatened with injunction proceedings. In this connection it is worthy of note that not a single case of infection has been traceable to the Santiago Hospital, which saved the lives of many Americans, including one of the petitioners against its establishment.

RESULTS OF CHOLERA WORK IN MANILA.

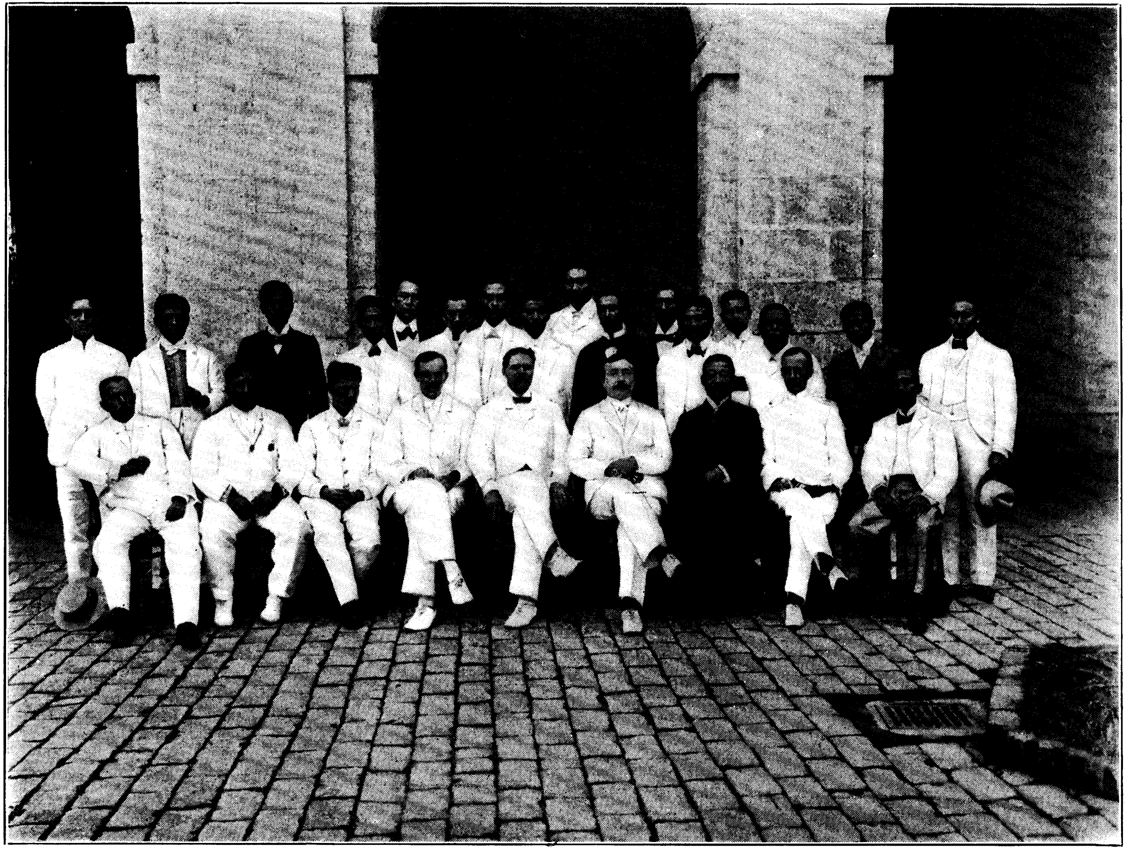
The measures enforced by the board of health in Manila were strikingly successful for months. With its congested population, its lack of any adequate system for the disposal of human excreta, and its many insanitary districts, the city affords a natural breeding ground for cholera. The maximum of daily cases during the first three months was 38, on May 1, and when this maximum had been reached a steady decline began. During the second week of May the drop was so marked as to lead the commissioner of public health to believe that the end of the epidemic was at hand, and on May 16 he made wholesale reductions in the force of sanitary inspectors and emergency employees. This action was disapproved by the remaining members of the board, but as the disease continued to decrease for some days after the reduction, the logic of events at first seemed to justify his action.

Within a short time, however, there began a slow but steady increase in the daily cases. This increase was called to the attention of the commissioner of public health by me when the daily cases reached 12, and again when they reached 20 to 25. When they rose to 36, on June 20, he was warned that the situation was becoming serious. He did not so regard it, but was nevertheless instructed that energetic measures must be adopted. At this time I was compelled by ill health to go to the mountains of Benguet for five weeks. During my absence the number of daily cases increased quite steadily until July 26, when 91 were recorded, this proving to be the maximum for the epidemic in Manila.

On July 31 the detail of Colonel Maus as commissioner of public health terminated. From the day of his appointment to this position he had worked with tireless energy, sacrificing himself as few men would have been willing to do for the public good. From the beginning of the cholera epidemic he had been subjected to a heavy and continuous strain, which, at the time he was relieved, had resulted in extreme mental and physical exhaustion. I desire to express my deep appreciation of the faithfulness and energy which he displayed in the discharge of his duties while commissioner of public health.

On August 1 Dr. Frank S. Bourns, who had been chief health officer of Manila for more than a year under military rule, and whose long residence in the Philippines had peculiarly fitted him to deal successfully with the Filipinos, was temporarily appointed commissioner of public health by the acting civil governor, and sacrificed his private interests in order to undertake a thankless task at a critical time.

The hostility of the Spanish and native physicians had reached a climax at the time of his appointment. By making certain changes in policy he succeeded in allaying to a large extent the hostility of the native physicians and in securing from them a considerable degree of cooperation. During the four weeks from July 6 to August 2 there were 1,222 cases of cholera in Manila. During the four weeks ending August 31 the number of cases fell to 668; during the month ending September 30 it was 296, and during the month ending October 31 it was 88. The total number of cases from the beginning of the epidemic to date has been 4,174. Estimating the inhabitants at 302,000, 1.38 per cent of the population have been attacked. In view of the fact that nowhere in the archipelago are conditions so favorable to a great epidemic, the value of strictly enforced sanitary measures is strikingly shown by contrasting this result with what has occurred in many of the provincial municipalities where the disease appeared at a much later date than at Manila, but where time was lost in enforcing the necessary health regulations or where it was impossible to enforce them at all. In Hagonoy 21.6 per cent of the population was attacked; in Macabebe, 32 per cent; in Orani, 18.7 per cent; in Dumangas, 13.9 per cent. Other towns from which reliable statistics are not yet at hand are reported to have suffered still more severely.



BOARD OF HEALTH FOR THE PHILIPPINE ISLANDS AND PRESIDENTS OF PROVINCIAL BOARDS OF HEALTH.

THE EPIDEMIC IN THE PROVINCES.

During the early days of the epidemic quarantine guards were placed on all roads, paths, and streams leading out from Manila, a water patrol was established on the bay, and all vessels leaving Manila were quarantined five days at Mariveles, and for a longer period if cholera developed on board. No one but a health officer could lawfully leave the city without a pass. The spread of the disease to the provinces was thus greatly retarded and its transmission by large vessels leaving Manila was almost entirely prevented, but it was carried by native canoes to the towns about the bay, and was then widely disseminated by small sailing vessels, the movements of which could not be controlled. Furthermore, it was impossible to prevent the escape overland of people by night, or even by day, if they choose to make their way through the fields. What General Otis could not accomplish with thousands of soldiers was an impossibility for the board of health, aided by the city police and a few hundred men from the insular constabulary.

Cholera appeared in the provinces as follows: Bulacan, March 23; Cavite, March 27; Bataan, March 28; Ambos Camarines and Rizal, April 2; Laguna, April 7; Pampanga, April 13; Pangasinan, April 24; Tarlac, April 28; Nueva Ecija, May 8; Leyte, May 9; Batangas, May 24; Samar, May 29; Mindoro, June 10; Tayabas, June 13; Zambales and Marinduque, July 1; Benguet, July 4; Cebu, July 14; Union, July 15; Western Negros, August 26; Iloilo, August 28; Surigao, September 5; Capiz, September 8; Eastern Negros, September 29; Misamis and Antique, October 2; Sorsogon, October 15; Romblon, October 31. In each new region where the disease appears it is very malignant at first, spreading rapidly and causing a very high mortality, but with the lapse of time it tends gradually to decrease in intensity and finally to disappear.

The strain imposed upon provincial and municipal boards of health by the appearance of cholera so soon after their organization was necessarily very severe. In some cases they have responded to it nobly, and in others they have gone down under it. The insular board of health has done all in its power to check the epidemic in the provinces by furnishing medicines and disinfectants and by sending experienced medical officers to those places where the situation has become most serious. Invaluable assistance has been rendered in the provinces, under orders from General Chaffee, by the army surgeons, who, with few and insignificant exceptions, have cooperated heartily with the civil health authorities, where any existed, and have taken entire control and fought a good fight in many places where there were no local civil health officers. The efficacy of proper sanitary measures has been demonstrated over and over again by the prompt and complete stamping out of cholera in provincial municipalities where the population is uniformly much less congested than in Manila. The disease has now practically disappeared from the provinces of Bulacan, Pampanga, Bataan, Rizal, Ambos Camarines, Marinduque, Tarlac, Laguna, Batangas, Nueva Ecija, Zambales, Cebu, Pangasinan, North and South Ilocos, Leyte, and Union. It is still raging with considerable violence in the province of Iloilo.

The total number of cases reported in the provinces up to date is 103,076, with 66,837 deaths. Adding the 4,174 cases and the 3,146 deaths which have occurred in Manila, the grand total for the epidemic up to date is 107,250 cases and 69,983 deaths, the mortality being 65.25 per cent.

The following table shows in summary form the progress of the epidemic:

	Manila.			Provinces.			Total.		
	Cases.	Deaths.	Mortality.	Cases.	Deaths.	Mortality.	Cases.	Deaths.	Mortality.
			Per cent.			*Per cent.*			*Per cent.*
March 20 to 31, inclusive	102	95	93.13	12	10	83.33	114	105	92.10
April	495	480	96.96	1,842	1,344	72.96	2,337	1,824	78.04
May	529	330	62.38	2,568	1,765	68.73	3,097	2,095	67.64
June	582	442	75.94	5,284	4,131	78.16	5,866	4,573	77.95
July	1,385	976	70.48	7,737	5,826	75.30	9,122	6,802	74.56
August	697	525	75.32	11,214	8,064	71.91	11,911	8,589	72.10
September	296	232	78.37	43,188	27,285	63.17	43,484	27,517	63.28
October	88	66	75.00	31,231	18,412	58.95	31,319	18,478	58.99
Total	4,174	3,146	75.34	103,076	66,837	64.84	107,250	69,983	65.25

DEATH OF DR. MEACHAM.

On April 14 the board of health suffered a very serious loss in the death of Dr. Franklin A. Meacham, chief health inspector, who had borne the brunt of the fight against bubonic plague, and from the beginning of the cholera epidemic had displayed tireless energy in his efforts to combat the new enemy. Although suffering from a high fever, he had for several days continued to expose himself to the intense heat of the sun by day and to work in his office until late at night, keeping his colleagues in ignorance as to his true condition. He gave up only when unable to rise from his bed, and died three days later of heart failure, which was the result of utter exhaustion from long-continued overwork. Dr. Meacham was an able administrator, and was endowed with the faculty, as valuable as it is unusual, of discharging disagreeable duties in such a way as to win not only the respect, but the regard of those most injuriously affected. He sacrificed his life in the discharge of his duty, and his death was an irreparable loss.

DEATH OF MR. J. L. MUDGE.

Six days later the board suffered another disaster in the death of Mr. J. L. Mudge, the efficient city superintendent of streets, parks, bridges, docks, and wharves, who had rendered invaluable aid in closing the wells, in cleaning up those regions where cholera was most prevalent, and in the establishment of detention camps and cholera hospitals. He had been warned in writing by his physician that his life was in danger, and had been ordered to go to the hospital, but had refused to give up his work at this critical time. The strain was too much for him, and on April 20 he passed quickly away from heart disease.

SPECIAL MENTION OF THE SERVICES OF OTHER HEALTH OFFICERS.

Before closing my discussion of the cholera epidemic I wish especially to call attention to and commend the following gentlemen: Dr. Charles F. DeMey, for stamping out cholera in the provincial towns of Macabebe, Hagonoy, and Bacolor, and for his efficient services in one of the worst districts in the city of Manila; Dr. Frank W. Dudley, for his efficient work while in charge of the San Lazaro detention camp and in fighting cholera at Orani and in the northern coast provinces of Luzon; Dr. Edward A. Southall, for his fine work, first, in his district in the city of Manila, and, second, while in charge of the Santiago Cholera Hospital, where he broke down physically as a result of the severe and long-continued strain; Drs. F. J. Combe, George A. Zeller, Isaac W. Brewer, and Henry E. Winslow, for their valuable and most efficient services in the city of Manila. I have previously made special mention of the work of Drs. Thomas R. Marshall, J. W. Jobling, and T. K. Hunt.

One of the most serious difficulties encountered, both in Manila and in the provinces, has been the securing of efficient inspectors. In too many cases the Filipino inspector does not himself appreciate the importance of the measures which it is his duty to enforce. He is unable to understand that these measures, to be made effective, must be enforced upon the rich as well as the poor, and the strong as well as the weak. In order to get satisfactory results from Filipino inspectors it has usually proved necessary to have them closely supervised by Americans. The cholera epidemic extended over the period of the long annual school vacation and necessitated the closing of the schools in many municipalities at times when they would, under normal conditions, have been in session. As a rule the teachers remained at their posts through the worst of the epidemic, and many of them rendered invaluable assistance to insular and provincial health officers by their wise, courageous, and energetic work in the municipalities. They aroused municipal officers to the imperative necessity of improving the sanitary condition of their municipalities before the scourge was upon them, and when it came voluntarily took up the disagreeable and dangerous task of searching out the cholera victims, quarantining the living, nursing the sick, and supervising the burial of the dead. I have seen them at their work in the provinces of Bataan, Pampanga, Tarlac, Pangasinan, and Union, and found them doing their duty effectively and unassumingly. Their services were invaluable, both from the direct results which they accomplished and from the far-reaching effect of the good example which they set. Mr. William H. Badger, of Malasiqui, Pangasinan, Mr. Robert R. Jamison, of Balanga, Bataan, Mr. Herbert Lucker, of San Miguel, Ilocos Norte, and Mr. R. Zumstein, of Nagcarlang, Laguna, paid for their devotion to duty with their lives.

The insular board of health and the insular government are greatly indebted to Dr. S. Kitasato, director of the Imperial Institute for Infectious Diseases at Tokio, Japan, for the large amount of useful information which he has furnished with reference to means of combating bubonic plague; for the courteous treatment and assistance accorded by him to the director of the Serum Institute and the superintendent of Government laboratories while in Japan; and, in general, for his interest and hearty cooperation in the work of the insular board of health, the Serum Institute, and the bureau of Government laboratories.

For further details of the work of the board of health for the Philippine Islands, reference is made to the report of Colonel Maus, former commissioner of public health, which is appended hereto and marked

"Appendix A." In justice to Colonel Maus it should be stated that owing to the pressure of work incident to the cholera epidemic, and to the fact that he sailed for the United States almost immediately after his detail as commissioner of public health ceased, he did not have time to prepare a proper report. The material which he got together has necessarily been revised by others, and the report, as finally submitted, conveys an imperfect idea of the work of the board from September 1, 1901, to July 31, 1902.

The report of Dr. Frank S. Bourns, covering the period from August 1 to August 31, 1902, during which time he served as commissioner of public health, which is appended hereto and marked "Appendix B," is quite complete. Attention is particularly invited to the cholera statistics therein contained. It is hoped that at some future time, when the cholera epidemic is over, a full report upon it may be published.

The work of Dr. Chas. F. DeMey, in suppressing cholera in the provinces, was so very successful that I deem it desirable to publish extracts from his report, which are appended hereto and marked "Appendix C."

THE QUARANTINE SERVICE.

Under the efficient management of Dr. J. C. Perry, passed assistant surgeon, U. S. Marine-Hospital Service, chief quarantine officer for the Philippine Islands, the most modern and best equipped quarantine station in the Orient has been constructed at Mariveles Harbor, at the month of Manila Bay. Ships of the largest size can come directly alongside the wharf, which is 400 feet long and 45 feet wide. The plant has sufficient capacity to allow the disinfecting of 150 passengers and their baggage every hour. The station is amply equipped for the detention of suspects, three barracks so arranged as to provide for six segregation groups being available for this purpose. Eighty cabin and a thousand steerage passengers can be cared for in these barracks at one time.

An effective quarantine service is of the greatest importance to these islands, which are constantly menaced by the danger of infection from the breeding grounds of disease afforded by the large neighboring centers of population in China. The presence of cholera and bubonic plague upon the Asiatic coast and in this archipelago has greatly increased the always onerous duties of the quarantine officers at Manila, which have been faithfully and efficiently performed. The boarding officer at Manila has been on duty continuously every day from 6 a. m. to 6 p. m., and the officer in charge of the station at Mariveles has often been on duty from 5 a. m. to 11 p. m. The clerical force has also been overworked.

During the fiscal year ending June 30, 1902, the effects of 33,387 passengers returning to the United States, including 110,317 pieces of large baggage, have been disinfected at the Manila and Mariveles stations; 12,158 persons have been detained for a period of five or more days, and 382 vessels have been disinfected.

Officers of the Marine-Hospital Service are stationed at Cebu and Iloilo, and the system of inspection at these ports is similar to that at Manila.

The quarantine work at Zamboanga and Jolo, where comparatively few foreign vessels enter, has been performed by surgeons of the United States Army.

Aparri has recently been made a port of entry, and on account of its proximity to Hongkong and Amoy a quarantine officer should be detailed for duty there.

Floating disinfecting plants for Cebu and Iloilo have been equipped during the year, at a total cost of $40,000.

Every effort was made by the quarantine officers at Manila to prevent the introduction of cholera from Canton and Hongkong after it was reported there. It seems certain that it was not brought in by passengers, nor were vegetables which could have brought it allowed to be landed. After the order forbidding the importation of fresh vegetables had been issued, a number of unsuccessful attempts to evade it were made. The temptation to smuggle vegetables into Manila was strong on account of the high price which they brought at this time, and it is not improbable that other efforts to evade the quarantine regulations in this respect may have been successful. It is known that condemned vegetables were thrown into the bay in defiance of the orders of the chief quarantine officer, and that they were washed up on the beach at the Farola district and eaten by the inhabitants. I deem this to be the most probable explanation of the introduction of cholera.

For a fuller description of the Mariveles quarantine station and further details of the work of the quarantine officers in the Philippines during the past year, reference is made to the report of the chief quarantine officer for the fiscal year ending June 30, 1902, and his monthly reports of July and August of the same year, which are appended hereto and marked "Appendices D, E, and F," respectively.

CIVIL HOSPITAL.

The importance of furnishing adequate medical attendance for civil officers, employees, and members of their families was realized at an early date by the Commission, and it was deemed advisable to employ regularly an attending physician and surgeon and an assistant to care for them. Much difficulty was experienced in giving proper attention to persons seriously ill at their homes. Trained nurses could not be had at prices within the means of employees drawing small or moderate salaries, if, indeed, they could be had at all. Equal difficulty was experienced in providing suitable food for those who required special diet, while the character of many of the private houses was such that surgical operations performed there would necessarily be attended with grave danger of infection. Under these circumstances the establishment of a hospital for the proper treatment of civil officers and employees became imperative.

The overcrowding of the city made it most difficult to secure a suitable building, and dependence was temporarily had upon the small Women's Hospital, founded by Mrs. Whitelaw Reid, but the number of beds available at that institution was far from sufficient to meet our needs, while the charges were so high as to be prohibitive for many of our employees.

The building which was finally secured by the civil government had been used as a barrack and was in bad condition, but it was thoroughly cleaned and renovated, and a well-equipped modern hospital of 80 beds has been established there.

Shortly after the outbreak of cholera a building adjacent to the main hospital was secured, and has since been utilized as an isolation ward for persons showing symptoms of, or suffering from, contagious diseases. Fortunately no contagious diseases developed at the hospital prior to the renting of this building. Since it has been secured there have been cases of measles, smallpox, and cholera among the patients.

The civil hospital has an attending physician and surgeon, an assistant attending physician and surgeon, a house physician, and a staff of most efficient nurses and hospital stewards. It is open to all civil officers, employees, and members of their families, whether resident in Manila or in the provinces. Patients who desire treatment in private rooms are charged $2.50 per day, while those who receive treatment in the wards are charged $1 per day. These charges cover board, medical attendance, and nursing. Persons whose annual salary is less than $480 are entitled to free treatment. The institution is thus made available for all servants of the government.

Emergency cases of whatever sort are received at the hospital and given free treatment until their removal can be safely effected. When the number of empty beds exceeds five, civilians other than officers or employees of the government may be received upon the payment of prescribed fees and may employ their own physicians, but if they desire treatment by the attending physician and surgeon must compensate him for his services.

From its inception the civil hospital has been of great use. Admission of patients began on October 12, 1901, since which date there have been admitted 1,428 patients, of whom 1,138 were Americans or Europeans and 290 were Filipinos. Since the appointment of the attending physician and surgeon in August there have been treated as "sick in quarters" civil officers, employees, and members of their families to the number of 2,410. The total number of patients treated during this period in and out of the hospital has been 3,838. There have been but 13 deaths, a record which is most creditable to everyone connected with the institution. The attending physician and surgeon reports that 112 cases of dysentery, 36 of which were amœbic, have been treated, and that only one has resulted fatally during the time they were under treatment.

The Government is obliged to pay a very high rent for the buildings occupied, which at the best are but indifferently adapted to hospital purposes and are situated in the immediate vicinity of low ground which can not be drained. A modern building on high ground is greatly needed, and should be provided as soon as funds are available to meet the cost of its erection.

For further information in regard to the civil hospital, reference is made to the report of the attending physician and surgeon, which is appended hereto and marked "Appendix G."

CIVIL SANITARIUM AT BAGUIO, BENGUET.

During the past year it has been possible to conduct some practical experiments as to the effect of the Benguet climate upon sick or debilitated persons. The opportunity presented itself to acquire a considerable tract of land with two houses upon it, owned by Mr. Otto Scheerer. The position of this land with reference to the probable future site of government buildings at Baguio was such as to make it seem desirable that the government should purchase it before further improvements were made upon it. One of the houses was assigned to the governor of the province as his official residence. The other, containing a dining room, a kitchen, and three bedrooms, with a total capacity of eight beds, was taken for a hospital. With considerable difficulty the necessary furniture and hospital supplies were sent up over the Naguilian trail, and the institution was opened with a personnel consisting of an acting superintendent, a nurse, a hospital steward, and the necessary servants. Later another nurse was added.

Plans were prepared for a new building to accommodate 60 beds, and to be constructed in such a way that the old building would form a part of it. The construction of six cottages to be occupied by the families of civil officers and employees in need of recuperation was also provided for. Work upon the projected improvements was begun immediately. Progress has necessarily been slow, as lumber could be had only by felling pine trees and sawing them up by hand, while it was necessary to take other supplies in over the Naguilian trail.

Very sick persons could not have endured the long, rough trip over the trail, but it has been possible to send a limited number of malaria patients and persons convalescing from dysentery and other wasting diseases. Forty-three persons have thus far been admitted to the sanitarium. A few of these were in good health and were members of the families of the real patients. Approximately four-fifths of those admitted sought relief from general debility induced by the tropical climate or by wasting diseases, and in nearly every instance they reacted promptly to the bracing air and rapidly improved. We now know positively what we had every theoretical reason to believe would prove true: that convalescents gain rapidly in weight, strength, and color at Baguio, and are soon restored to vigorous health. In some instances slight discomfort is felt during the first few days owing to the change in altitude, but this soon passes away.

The first estimate of the time required to complete the cottages and the addition to the sanitarium building proved inaccurate. Owing to strikes among the workmen, cholera, bad transportation, the extraordinary rainfall during the month of August (54 inches), and scarcity of labor, progress was much slower than had been anticipated. The force of nurses and hospital attendants, based on this estimate, proved unnecessarily large, and it became evident that if patients, even when convalescent, were to be sent to Baguio there must be a physician and surgeon there to attend them. Act No. 429 was accordingly adopted, reducing the original force to 1 nurse, 1 hospital steward, 1 cook, and 2 native servants, and providing for the appointment of an attending physician and surgeon.

Many of the persons who have been at Baguio are anxious to secure building lots there in order that they may erect cottages and send their families to Benguet during the hot season. The establishment of homes where the families of civil officers and employees can at any time and at small expense get the beneficial effects of a bracing climate will greatly add to the stability of the civil service, and I urge the surveying of a town site on government land and the sale of building lots in the near future, in order that it may be possible for those who desire to do so to build at Baguio. When this can be done many persons who now hesitate to bring their families to the Philippines will feel perfectly safe in sending for them.

For further details in regard to the work of the civil sanitarium, reference is made to the report of the attending physician and surgeon, which is appended hereto and marked "Appendix H."

A year's meteorological observations have furnished the following data with reference to the climate at Baguio: February, with a mean temperature of 62.1° F., is the coldest month. The temperature rises rapidly in March, reaching its maximum for the year in April, which has a mean of 70.5°. A second minimum occurs in August, which has a mean of 64.6°. The temperature again rises slightly in October and November, falling from that time until February. It is always from 12 to 16 degrees cooler at Baguio than at Manila, as is shown in the following table:

Table of mean temperatures at Manila and Baguio.

	January.	February.	March.	April.	May.	June.
Manila	77	77.7	80.4	82.9	83.3	82
Baguio	63.5	62.1	66.9	70.5	68.3	67.2
Difference	13.5	15.6	13.5	12.4	15.0	14.8

	July.	August.	September.	October.	November.	December.
Manila	80.8	80.8	80.4	80.8	79	77.4
Baguio	66.5	64.6	67	67.6	66	64.3
Difference	14.3	16.2	13.4	13.2	13	13.1

The maximum temperature for the year, 82.8°, occurred on April 19. This is slightly higher than the maximum temperature with which Baguio has been credited. The minimum for the year, 42.1°, was recorded February 18.

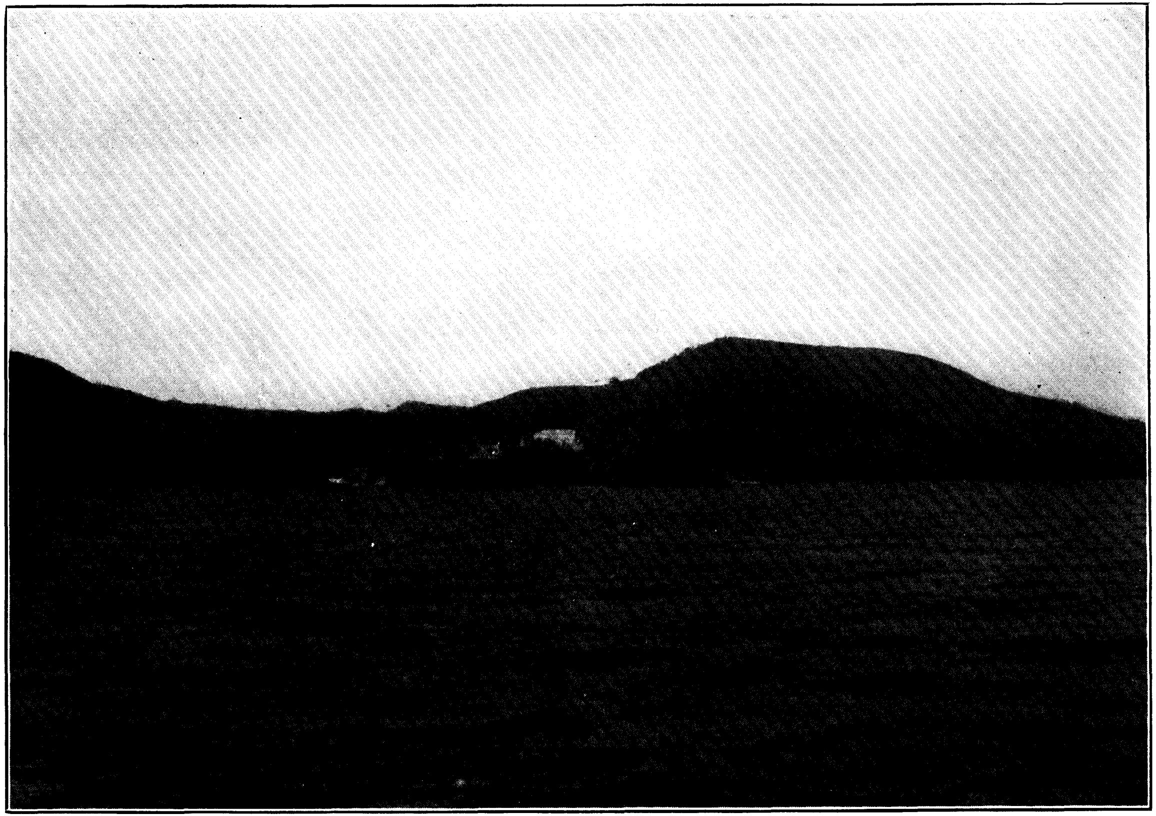
The relative humidity was slightly greater at Baguio than at Manila, except during the months of October and November, when it was less. By months it was as follows: January, 76; February, 79; March, 76; April, 74; May, 86; June, 90; July, 89; August, 93; September, 90; October, 83; November, 82; December, 84.

Except during the months of July, August, and September, the mornings were almost uniformly free from fog. It is an interesting fact that for every month of the year there is less cloudiness at Baguio than at Manila. The rainfall by months was as follows: January, 0.06 inch; February, 0.57; March, 1.46; April, 0.32; May, 4.02; June, 12.55; July, 15.43; August, 37.03; September, 11.90; October, 4.95; November, 2.52; December, 5.47; total, 96.28. It will be noted that January, February, March, and April are very dry, the greatest dryness occurring at the time of greatest heat, in April. June, July, August, and September are wet, and moderate rains occur during October, November, December, and May.

These facts fully confirm the information previously secured by the Commission with reference to the climate of Baguio.

THE PROPOSED LEPER COLONY.

There are three leper hospitals in the Philippines, situated at Manila, Palestina, and Cebu, respectively. During the past year a beginning



CULION, THE ONLY SETTLEMENT ON THE ISLAND OF THE SAME NAME. PROPOSED TO USE AS A LEPER COLONY.

has been made toward taking a leper census of the islands. This census is already quite complete for many of the provinces, and its results lead to the conclusion that the estimate of those persons who have heretofore expressed the belief that there were 30,000 lepers in these islands is wide of the mark. It is believed that the total number will not exceed 10,000, and it may fall considerably below this figure.

The desirability of establishing a colony where persons in the early stages of leprosy can have their homes, cultivate the soil, and in general lead a free out-of-door life, instead of being practically imprisoned and compelled to pass their days in company with fellow-unfortunates in the last stages of this horrible disease, has long been appreciated by both military and civil authorities. Efforts were made by the military government to find an island suitable for the establishment of a leper colony, and a military board reported favorably on the island of Cagayan de Joló, after somewhat cursorily examining it. As satisfactory information was not given as to the supply of drinking water on this island, and as the accuracy of the board's report that there were but 200 or 300 inhabitants had been seriously questioned, a committee consisting of the commissioner of public health, the sanitary engineer, and the secretary of the interior was appointed to reexamine the island, and if it did not prove satisfactory to search for a more favorable one.

This committee reported adversely on the island of Cagayan de Joló, on account of the entire lack of a favorably situated supply of drinking water, the absence of any port, and the presence in the island of some 3,000 Moros, whose removal would have been both difficult and expensive, and recommended the island of Culion, in the Calamianes group, on account of its healthful climate, rich soil, extensive cattle ranges, abundant water supply, good harbors, and small population. The present inhabitants are so few and have so little property that their removal, if deemed necessary, can be effected with little difficulty and at small expense.

For further information as to the islands of Cagayan de Joló and Culion, reference is made to the report of this committee, which is annexed hereto and marked "Appendix I."

An appropriation of $50,000 was included in act No. 389 for the purpose of erecting a warehouse on Halsey Bay, building a road to the proposed site of the colony, and erecting superintendent's house, hospital, and 100 separate dwellings for lepers, the hospital and dwellings to be of bamboo and nipa palm, which the island of Culion produces in abundance. Unfortunately the cholera epidemic prevented the prosecution of this work, and the appropriation lapsed at the end of the fiscal year. A new appropriation was made in October, and it is hoped that the colony may be established and the inmates of the San Lazaro, Palestina, and Cebu lazarettos transferred to it during the coming dry season.

THE FORESTRY BUREAU.

The work of the forestry bureau has progressed without interruption during the past year. The chief of the bureau, Capt. George P. Ahern, Ninth U. S. Infantry, was absent on leave in the United States from May 18 until December 1, 1901. During this period the affairs of the bureau were ably directed by its assistant chief, Mr. Albert E. McCabe, who has recently severed his connection with it, greatly to my regret, in order to engage in the practice of law. Mr. McCabe had a good legal training, combined with executive ability, thorough familiarity with extensive lumbering operations as carried on in the United States, and with the methods in vogue in these islands, and his place will be difficult to fill.

The visit of the chief of the bureau to the United States resulted in securing the services of a number of valuable men, and since their arrival extensive field operations have been undertaken in order to ascertain the character and amount of timber in the provinces of Bataan, Tayabas, and Ambos Camarines, and in the island of Mindoro.

The method followed in estimating timber is to select and measure "average acres." A detailed study of each such acre is then made, the stand and varieties of timber, their peculiarities of growth, the character of the soil, rock formations, etc., being considered. Valuation surveys have already been made for 600 such acres in Bataan Province.

The surveys thus far completed show an average stand per acre of 7,000 cubic feet of marketable timber (over 20 inches in diameter), and the statement that there is an average stand of 3,500 cubic feet of such timber per acre of the 20,000,000 acres of virgin forest estimated to remain in this archipelago would probably be conservative.

A well equipped timber-testing laboratory has been established at Manila and important practical experiments for the purpose of ascertaing the qualities of the different Philippine woods are now in progress. No systematic series of properly conducted tests have heretofore been made, even upon those of our woods which are best known, and the practical importance of this work is very great, as it will doubtless result in bringing into commercial use many varieties of wood which are not marketable to-day because their properties are unknown.

The timber cut and marketed in these islands during the past year has been entirely insufficient to meet the local demand. It has been necessary to import millions of feet of American pine and redwood and of timber from Borneo and Australia. Between May 4 and August 12, 1902, the price per cubic foot of ipil increased from $0.95 to $2 United States currency; that of molave from $1.10 to $1.80, and that of tindalo from $0.95 to $2. It is often impossible to purchase our best hard woods at any price, and any surplus in the near future will be promptly absorbed by the China market. The lack of suitable means for transporting logs is the main cause of the existing shortage of lumber. The carabao, which is the only draft animal in the islands capable of hauling logs, is unsatisfactory at the best, and a large percentage of these animals have recently died of rinderpest. The lumber company which first successfully introduces modern logging methods here will make very handsome profits.

INCREASE IN WORKING FORCE.

The working force of the forestry bureau has been materially increased during the year, and divisions of inspection, of forest management, and of botany have been created. The efficiency of the work of the division of inspection is shown by the increasing revenues derived from the dues collected on forest products.

BOTANICAL COLLECTIONS.

Extensive botanical collections have been made during the past year which should afford material for the identification of a large number of our more important tree species, and a botanist has been sent with them to Buitenzorg, Java, in order that he may make use of the famous botanical gardens and the fine herbarium and library there in identification. Much difficulty in classification, and in the collection of government charges on lumber, is at present occasioned by the fact that the exact identity of many of our commoner tree species is not known to us. It is hoped that this state of affairs may be remedied to a considerable extent in the near future.

FORESTRY REGULATIONS.

The present forestry regulations have proved satisfactory in the main, but the time has arrived for carefully revising them in the light of practical experience extending over a period of more than two years. There has been some complaint that the government charges on lumber were too high, but in view of the high prices which the local lumbermen get for all timber which they are able to put on the Manila market, this complaint seems groundless.

Provision should, however, be made for the issuing of licenses under special contract, covering periods sufficiently extended to justify companies in installing plants large enough to carry on lumbering operations over considerable tracts, under the supervision of the forestry bureau. One of the difficulties under which we labor at present is that the large and old trees, which are capable of furnishing the finest lumber, can be felled only with great difficulty with the crude appliances now available, and when once felled can not be handled, as carabaos, even in those provinces where a considerable number of them are still available, can not haul the larger logs. The result is that these trees are allowed to stand until they die. Their removal will necessitate the construction of tramways or the use of a cable system of logging, which will take comparatively large capital. It is thought by the chief of the forestry bureau that a period of at least ten years should be granted by contract license for this kind of work, and that such licenses, covering tracts of forest specifically indicated by the forestry bureau, should be granted to the highest bidders. The forestry bureau would furnish working plans of such tracts, showing the variety and amount of timber which could be cut, the length of the haul, market price of the better-known varieties, and cost of transportation, in order that intelligent bids might be made. Under the regulations proposed by the chief of the forestry bureau, the local residents in districts covered by special contracts would be given every facility to secure such lumber as they might require for their personal use, and the contract would cover only timber cut for the market. The necessity of supervision over the cutting of timber is demonstrated by the fact that under the old haphazard policy some islands and many provinces have been practically denuded of merchantable timber.

During the past year no lumber company has cut as much as 100,000 cubic feet. Under the contract license system, if adopted, it is hoped that a larger amount of timber will be cut. It will take a number of well-equipped companies many years to cut a small part of the overmature timber which the forestry bureau is now ready to mark for immediate removal.

PHILIPPINE SAWMILLS.

There are 14 sawmills in the Philippine Islands using steam or water power, 8 of which are in Manila and 6 in the provinces. An extremely slow feed and first-class sawyers are necessary in working up the hard woods. The slowest feeds of some of the saws recently set up in Manila proved too fast and teeth were stripped from them in consequence. The Manila mills have a total daily capacity of 3,660 cubic feet. There are in addition 33 establishments in Manila where sawing is done by hand. These hand mills employ 432 men, using 159 saws, and have a daily capacity of 1,897 cubic feet. The cost per cubic foot of sawing by hand is usually not less than 30 cents Mexican. The lowest price at which any steam mill at Manila is sawing into boards an inch or more in thickness is 17 cents per cubic foot, and this price applies only to mixed shipments, a higher price being charged for shipments composed exclusively of the harder woods. The other mills charge from 30 to 50 cents per cubic foot for mixed shipments.

EXTENT OF FOREST LANDS.

The forest area of the Philippines, including all public and private woodlands, was estimated by Fernando Castro in 1890 to be 48,112,920 acres. The area of private woodlands held under valid title is far below 1,000,000 acres. Under existing forestry regulations owners of private woodlands must register their titles in the forestry bureau before cutting thereon timber or firewood for the market. The total area of private woodlands thus far registered is approximately 250,000 acres. It will be readily seen, therefore, that under existing conditions the timber necessary for the people of these islands comes almost exclusively from the public lands.

RUBBER AND GUTTA-PERCHA.

Dr. P. L. Sherman, who was sent to investigate the rubber and gutta-percha industries in the Straits Settlements, Java, and Sumatra in 1901, and whose report thereon has already been made public, was upon his return dispatched to Mindanao and the Sulu Archipelago with a view to investigating as carefully as possible the question of the existence of rubber and gutta-percha in the forests of the southern Philippines, the character of such products if found, the practicability of marketing them, and the protective measures necessary to prevent the destruction of trees, which has been carried on with such disastrous results in Borneo, Java, and the Straits Settlements. The results of his work are embodied in an important communication, which the chief of the forestry bureau has incorporated in his annual report (see Appendix J).

Dr. Sherman made an unsuccessful attempt to reach Sibutu, the westernmost island of the Sulu Archipelago, but was informed that neither rubber nor gutta-percha grew there. Tawi Tawi was found to produce both in large quantities. He reports gutta-percha plentiful in certain parts of Mindanao, but did not find rubber, although the Moros assured him that it grew about the headwaters of the Rio Grande. Numerous samples of rubber and gutta-percha were secured. Dischopsis gutta, the tree from which is obtained the finest gutta-percha known, was not met with, but other trees of the same genus were found. The gutta-percha of the southern Philippines is of fair to poor quality, containing a considerable amount of dirt and resin, but a method has been worked out in the government chemical laboratory for the extraction from it of chemically pure gutta, equal in every way to the best gutta heretofore put upon the market, which, before the supply was exhausted, brought $700 (Mexican) a picul in the Singapore market. The crude gutta-percha from which our pure gutta is extracted costs from $30 to $70 (Mexican) per picul in the Mindanao market. The purifying process involves the loss of about 50 per cent of the original mass.

Dr. Sherman found that the felling and ringing of gutta-percha trees, which has wrought such havoc in other gutta-producing countries, was in vogue throughout the southern islands in spite of forestry regulations to the contrary. In Tawi Tawi gutta-percha is extracted from time to time by the Moro inhabitants at the direction of the Sultan of Sulu, who purchases the product at his own price and then markets it. In Mindanao, however, although the Moros bring the gutta-percha to the market, it is extracted for the most part by the wild people inhabiting the almost unknown interior of this great island.

It is easy to adopt regulations prohibiting the destruction of gutta and rubber trees, but under existing circumstances such regulations can not be made effective in the regions where these trees grow. They are usually found singly and at considerable intervals over enormous areas, and it is simply impossible to watch and protect the individual trees, yet the prevention of their destruction is a matter of the utmost importance.

In view of the experience of other countries and the evident uselessness of the protective methods that have been there followed, I am inclined to recommend the establishment of a government monopoly in gutta-percha. Exportation, except by the government, could be prohibited, and such prohibition could be made fairly effective. Government buyers could be located at suitable points. The government could well afford to pay a price considerably higher than that which has heretofore prevailed for the Philippine product, thereby avoiding ill feeling on the part of the gatherers, and by limiting the amount which it purchased could greatly retard the present rapid destruction of the trees. The government buyers would necessarily come in close contact with the collectors, and something might eventually be done in the way of introducing proper methods of extraction in place of the present destructive processes, although the experience of other countries leads me to doubt whether much can be accomplished along these lines. At all events, the establishment of suitable extraction plants would make it possible to utilize the large amount of gutta-percha which is now left in the bark of trees that have been felled and ringed. As time went on it might become feasible to grant the privilege of extracting and marketing gutta from the trees in fixed areas, under suitable regulations, to private individuals.

Dichopsis gutta should be brought in from Borneo for planting, and adequate provision should be made to grow government gutta-percha forests, conveniently situated and capable of thorough protection, before the native trees are destroyed.

I am fully convinced that the only method of stopping the destruction of gutta trees which can be made immediately effective is the prohibition of exportation, except by the government, and the limitation of the amount of the product acquired by the government for this purpose. Legislation on this general subject will be recommended to the Commission in the near future, and prompt action should be taken.

At the present rate of destruction there will be no gutta-percha trees standing four years hence.

It is difficult to obtain really reliable information as to the present exports of gutta-percha from the Philippines. Singapore is the principal and almost exclusive Eastern market for it. During the calendar year 1901 the Sulu Archipelago was credited with 1,966.5 piculs and the Philippines with 105 piculs. The average import value of the gutta-percha received at Singapore directly from the Philippines was only $76.68 (Mexican) per picul, as compared with $169.91 (Mexican) for the product received from other sources, but it is known that large quantities of gutta-percha not credited to these islands, but actually shipped from our southern ports, are credited to Borneo.

QUANTITIES OF FOREST PRODUCTS TAKEN FROM PUBLIC LANDS DURING THE FISCAL YEAR ENDING JUNE 30, 1902.

There have been taken from the public lands of the Philippines during the fiscal year ending June 30, 1902, 3,637,392 cubic feet of timber, 3,808,870 cubic feet of firewood, 247,947 cubic feet of charcoal, 20,685 pounds of rattan, 2,256,458 pounds of dyewoods, 312,154 pounds of tan bark, 1,082,235 pounds of gum mastic, 282,996 pounds of rubber (of superior quality), 373,331 pounds of gutta-percha (of low grade), 9,181 gallons of vegetable oils, 113,905 pounds of pitch, and 20,685 pounds of cinnamon.

The total revenue derived from these products was $348,073.08 Mexican. Government charges on timber during this period have averaged a little more than 6 cents (Mexican) per cubic foot, which has been between 5 and 10 per cent of the market price of the timber at Manila.

Government dues on forest products are collected by provincial treasurers, or, in the provinces where civil government has not been established, by internal-revenue officers, and covered into the insular treasury. The cost of maintaining the forestry bureau for each quarter is deducted from the revenues so received, and the balance remaining is divided between the provincial and municipal governments in the provinces from which the products originally came, one-half of the amount remaining after the pro rata deduction for the expenses of the forestry bureau going to each provincial government and the remaining half being distributed among the several municipalities in proportion to the amount of the original collections on the products coming from each of them, the close relationship between the construction of roads and the practicability of the removal of lumber from the forests making it seem to the Commission desirable that a considerable part of the funds derived from taxes on forest products should be spent in the regions from which such products are derived. Prior to July 1, 1902, all revenue from forest products was returned to the provinces and municipalities, and the entire expense of maintaining the forestry bureau was borne by the insular government.

For further details relative to the work of the forestry bureau reference is made to the report of the chief of the bureau, which is appended hereto and marked Appendix J.

MINING BUREAU.

The mining bureau still remains without satisfactory quarters, and there seems little probability that this difficulty can be remedied except by building. It is hoped that, after the completion of the main building for the bureau of government laboratories, wings may be added which will accommodate the mining bureau, forestry bureau, bureau of public lands, and agricultural bureau.

The mining bureau has been obliged to move during the present year from the cuartel de ingenieros to the old mint building, where it is now temporarily housed.

The work of the bureau has progressed very satisfactorily during the past year. A number of important reports have been prepared by its chief, among which may be mentioned a report on the Sanger, Vera & Co. claims and record, a report on the Gil Brothers' coal mining claims on the island of Batan, a report on the mining claims of Antonio Fuset, a report on the Spitz coal mines and claims in Cebu, and a report on the iron mines of Angat, in Bulacan, including the Constancia, Santa Lutgarda, and Hison mines.

The important work of completing a chronological index to the records, archives, books, and papers of the mining bureau has been practically finished. The index books show in chronological order every document and entry, with a brief abstract giving the nature of the paper referred to, the province to which it relates, the class and kind of material, the name of the person or persons in interest, and a reference to the portfolio or book in which the original document can be found. The great mass of records in the mining bureau has thus been made readily accessible, and I take pleasure in expressing my satisfaction at the accurate and painstaking manner in which this difficult and tedious work has been performed.

MINERALOGICAL AND GEOLOGICAL SURVEYS.

The restoration of order throughout the archipelago has made it possible to send out field parties, and the mining bureau has inaugurated a proposed series of mineralogical and geological surveys by making a detailed examination of the iron-mining region in the vicinity of the municipality of Angat, in the province of Bulacan. A party of seven men remained in the field for forty-five days, at a total cost to the insular government of $527.55 United States currency. A large amount of information was secured and embodied in a special report entitled "Report on a geological reconnaissance of the iron region of Angat, Bulacan." This report will be issued as a bulletin of the bureau, and will form one of a series of bulletins for the use of miners and prospectors and for the information of the general public. The first of this series, entitled "Platinum and associated rare metals in placer formations," has already been published and widely distributed.

An abstract of the Spanish mining code for these islands, previously prepared by the chief of the mining bureau, has been carefully revised, annotated, and published. It should be of great use in the settlement of legal questions which may arise with reference to Spanish mining grants.

Considerable additions have been made to the museum of the bureau during the past year.

In view of the enactment by Congress of a mining law for this archipelago, which places the administrative work with reference to mining claims hereafter located in the bureau of public lands, it would seem advisable to also transfer to that bureau the administrative work arising in connection with the old Spanish mining grants, which under the Spanish law was performed by the mining bureau. Legislation to this end will be recommended in due time.

LEGISLATION RECOMMENDED.

While there has been some complaint among miners as a result of the provision of the recent act of Congress that "the holder of a mineral claim shall be entitled to all minerals which may lie within his claim, but he shall not be entitled to mine outside the boundary lines of his claim continued vertically downward," the only provision in that act with reference to mineral lands which has provoked serious criticism is the one contained in section 33, which prohibits any person from holding "in his, its, or their own name or in the name of any other person, corporation, or association more than one mineral claim on the same vein or lode."

It should be remembered that there is no mining industry in the Philippines to-day. Although many of the islands undoubtedly have rich and extensive mineral deposits, the obstacles imposed upon the prospector by the heat of the lowlands and by the dense tropical vegetation, which usually covers and to a large extent conceals soil and rock formations, as well as by the existing lack of transportation facilities, are very great. There have been found in Benguet and Lepanto small bodies of extremely rich ore, but the veins are narrow and crooked owing to volcanic action, which has played such an important part in these islands in the recent past, and to earthquakes, which are still very frequent, and "faults" are extremely common. It is not to these small bodies of rich ore, therefore, that the miner must look for his returns, but to large masses of low-grade free-milling ores. Considerable masses of such ores have been found, but they are for the most part far from the seashore, and their successful development necessitates the construction of roads and the installation of expensive machinery. The miners maintain, with apparent reason, that the necessary capital can not be secured for the development of these deposits if no person or association of persons is allowed to own or have an interest in more than a single claim on the same vein or lode.

It is surely unnecessary to discuss the advantages which would result from the active development of the mineral wealth of these islands, and there would seem to be no good reason why the miners here, who must create a new industry, should not be as liberally treated as are miners in the United States. I therefore hope that the Commission will urge upon Congress the modification or repeal of section 33 of "An act temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes."

For further information as to the work of the mining bureau, reference is made to the report of the chief of the bureau, which is appended hereto and marked "Appendix K."

BUREAU OF PATENTS, COPYRIGHTS, AND TRADE-MARKS.

The work of this bureau has remained so small that it could be readily performed by one clerk who has acted under the general supervision of the chief of the forestry bureau. Since July 1, 1901, 224 certified copies of United States patents and 84 certificates of registration of the United States trade-marks have been filed. The receipts of the bureau from fees during this period have been $331.15 United States currency. In addition to this the sum of $259.50 Mexican currency was received from sales of stamped paper for the annual payment of patents and the renewal of trade-marks granted by Spain and in force in these islands on the date of American occupation. There are about 3,000 Spanish patents, 202 Spanish trade-marks, and 152 Spanish copyrights on file in the bureau.

Although provisions exist at present for the protection of United States patents and trade-marks here, there is no protection for United States copyrights, nor is it possible for inventors to protect themselves by taking out patents in these islands. Although the Filipinos are apparently not an inventive people, the few applications for patents and for copyrights which have been made since 1899 having come almost exclusively from Americans or Europeans, the lack of a law providing for the registration and protection of trade-marks has been a great hardship. The American occupation has led to the introduction of many new articles of commerce and has caused a greater demand for articles previously used, but there is no protection for new trade-marks, and advantage has been taken of this fact to flood the market with cheap imitations of many standard articles. It is important that a trade-mark law should be speedily enacted.

For further information as to the work of the bureau of patents, copyrights, and trade-marks, and for a brief résumé of orders, circulars, and letters relative to patents, copyrights, and trade-marks in the Philippine Islands, reference is made to the report of Capt. George P. Ahern, Ninth United States Infantry, in charge of the bureau, which is appended hereto and marked "Appendix L."

BUREAU OF GOVERNMENT LABORATORIES.

The reasons which led the Commission to establish a bureau of government laboratories were enumerated in the last annual report of that body. The policy outlined in that report has been strictly adhered to during the past year, and the not altogether unnatural desire on the part of heads of bureaus to establish separate laboratories for carrying on their special lines of work has been steadily resisted. As a result a broad foundation has been laid for future scientific work in connection with the safeguarding of the public health and the development of the material resources of this archipelago, where such work, if properly carried on, will certainly lead to results even more important and far-reaching than those which have been obtained under somewhat similar conditions in Java. Except for some investigation in systematic botany, and the meteorological, astronomical, and magnetic work of the Manila Observatory, no scientific research worthy of the name was carried on under Spanish rule, and we found ourselves practically without equipment and entirely without laboratory facilities for such work.

Dr. Paul C. Freer, whose familiarity with the laboratories of Europe and America fitted him to superintend the establishment and equipment of this important bureau, was appointed its chief and accepted the position on June 21, 1901. Under instructions from the Commission he visited many laboratories in the United States for the purpose of seeking available candidates for future positions in the Philippine service and of obtaining information likely to be useful in planning a suitable building and equipping it with the necessary library and apparatus. He reached Manila on September 25.

There had existed prior to his arrival a "municipal laboratory of Manila," established under the military government, where biological and chemical work had been carried on for the board of health of Manila. The property belonging to this laboratory had passed to the possession of the civil government, but it had been necessary to vacate the old laboratory building and store the apparatus in the basement of the civil hospital. The urgent necessity of laboratory facilities in connection with the work of the civil hospital and the insular board of health made it imperatively necessary that this state of affairs be remedied at once. A small building immediately in the rear of the civil hospital was finally secured, and, although it was not suited for laboratory purposes, such apparatus as was available was installed there and chemical and biological work begun. It has been necessary to make two additions to this building in order to get the laboratory force and the gradually increasing equipment under cover; but, in view of the fact that the construction of an adequate and suitably equipped building for the bureau has been contemplated from the outset and has now actually begun, no expense has been incurred in connection with the present quarters which could be avoided.

From the day the laboratory was opened the insular board of health, the bureau of customs and immigration, the civil hospital, and the courts of the islands availed themselves of the opportunity afforded by its inadequate facilities, and the volume of work has steadily increased until it has reached a limit which can hardly be exceeded prior to occupancy of the new building.

Richard P. Strong, Ph. B., M. D., first lieutenant and assistant surgeon, U. S. Army, who had carried on important investigations with reference to tropical diseases during his army service in the Philippine Islands, and who was at the time absent on leave in the United States, was appointed director of the biological laboratory and arrived in Manila on January 1, 1902. Most of the employees of the Manila municipal laboratory were taken over at the outset, and others have been added from time to time. The working force of the bureau at present consists of 1 chemist and investigator, 1 chemist, 1 physiological chemist, 1 analytical chemist, 2 assistant chemists, 1 assistant biologist, 1 assistant bacteriologist, and a photographer, with the necessary clerical assistants and laboratory servants.

A large amount of the time of the superintendent of government laboratories has been devoted to completing plans for a new building, in cooperation with the chief of the bureau of architecture, and to listing and securing prices on the books and apparatus necessary to properly equip it.

This building, upon which work has already begun, will provide adequate space for the chemical and biological laboratories, the serum institute, and for a library of 30,000 volumes. It is intended primarily as an institution for practical investigation rather than for instruction, and large rooms are therefore unnecessary. Each class of work will have separate space allotted to it so that it will not interfere with other work which is being carried on simultaneously. The chemical laboratory will afford space and thoroughly adequate facilities for the analysis of minerals, mineral products and rocks, water, soils, food products, paints, oils, beverages, and other materials, and for investigations with reference to the natural resources of the islands, the means of improving present products, and the possibility of developing new industries. Rooms will be provided for distillation, for the examination of plant products, and for work in pharmacology with special reference to the value of our numerous medicinal plants.

A part of the ground floor of the chemical laboratory will be set aside for a physical laboratory, which will be equipped for gravimetric, volumetric, thermometric, and photometric work, and for electrical measurements, and will provide suitable facilities for the work of standardizing weights and measures.

The biological laboratory will have suitable space and proper equipment for the making of diagnostic analyses, bacteriologically and otherwise, and for the investigation of tropical diseases of man and of the plants and animals useful to man.

In order to give the necessary floor space for carrying on these several kinds of work, and for housing an adequate library, the building will be two stories high, 216 feet long, and 60 feet wide. Laboratory desks will be provided with gas and water, and where necessary with steam and vacuum. An adequate power plant will furnish vacuum, steam, and water, and will supply electricity for the various motors, and for lighting the building. Boilers and engines will be housed in an addition 115 feet long and 68 feet wide, in the rear of the laboratory structure proper. This space will afford room for the necessary engines and boilers, and for additional boilers and engine space when the erection of other government buildings makes it desirable to derive more power from this plant. In the addition will also be established the laboratory of the serum institute, and a refrigerating room for the preservation of serums and prophylactics, and such other chemicals and supplies as must be kept cold. Animal houses will be built in the rear of the laboratory building. The details of the building have been planned by the insular architect, Mr. E. K. Bourne, and will be found in his annual report, which appears as an appendix to the report of the secretary of public instruction.

When this building is erected and equipped the facilities which it will afford for investigation, taken in conjunction with the rich material available, will certainly serve to attract scientists to this interesting and important field. It is an encouraging fact that a number of well-known investigators have already indicated their willingness to come to these islands and work for a year or more, for their bare expenses, when suitable facilities have been provided.

THE SERUM INSTITUTE.

A serum institute under the insular board of health was provided for by act No. 389, and has been established on the San Lazaro Hospital grounds, where temporary sheds for vaccine calves and for horses and cattle, as well as fenced inclosures for isolating animals which are under treatment, have been provided. A limited amount of antiplague serum was manufactured here during the last days of the plague epidemic, but the greater part of the serum used in combatting this disease was imported at considerable expense from Japan, before the establishment of the institute. The imperative necessity of manufacturing antirinderpestic serum in large quantities, if the prostration of agriculture which at present exists in these islands, due to the loss of draft animals, is to be relieved; the standing necessity for the manufacture of vaccine virus in large quantities; the presence of hog cholera and of other very destructive epidemic diseases of domestic animals, such as surra, glanders, and hoof and mouth disease, sufficiently indicate the importance of the future work of the serum institute, not only in manufacturing serums already known, but in conducting investigations, in conjunction with the biological laboratory, for the working out of serum treatments for combatting diseases for which no remedy has yet been found. It seems evident that the serum institute should be incorporated in the bureau of government laboratories, and legislation to this end is recommended. As a matter of fact, although nominally under the insular board of health, its operations have thus far been actually superintended almost exclusively by the directors of the biological and chemical laboratories.

WORK OF THE CHEMICAL LABORATORY.

In spite of inadequate facilities the routine work of the chemical laboratory during the past year has embraced 89 analyses of paints, 31 of liquors, 25 of oils, 1 of glycerin, 6 of foods, 11 of textile fabrics, 15 of coals, 5 of iron ores, 3 of other minerals, 3 of limestones, 8 of soil, 1 of wood extract, 1 of stone, 319 of urine, 11 of carabao and cow milk, 3 involving suspected poisoning, 6 of water, 1 of coffee, 2 of human milk, 1 of salt, 2 of gastric juice, 1 of contents of stomach, 1 of feces, 5 of disinfectants, and 15 miscellaneous, making a total of 566 analyses. In addition to 170 analyses for the custom-house, the director of the chemical laboratory has been called upon to make 8 custom-house decisions. The departments of the government interested in this work have been the bureau of customs and immigration, mining bureau, forestry bureau, bureau of architecture, civil hospital, insular board of health, courts of first instance, police department of the city of Manila, insular purchasing agent, bureau of agriculture, and Bilibid prison. I believe I am correct in saying that in but one instance has an appeal been taken from a custom-house decision based upon results obtained in the laboratory, and a considerable saving of revenue to the government by proving the exact nature of substances which it was desired to pass through the customs, has resulted. In the case of paints, for instance, of which 77 samples were examined, 55 were zinc colors, of which 53.3 per cent were found to contain materials that caused a surtax of 50 per cent of the regular rate to be collected, and 78.4 per cent of the remaining metallic colors examined were also found to be liable to a surtax of 50 per cent.

The laboratory has also manufactured upon a considerable scale benzoyl-acetyl peroxide, which has been used very successfully in combatting cholera and in the treatment of amebic dysentery. For further details as to the results of the use of this new antiseptic, see the report of the superintendent of government laboratories (Appendix N).

Very important work has also been done on gutta-percha, resulting in the discovery of a simple, comparatively inexpensive, and commercially practicable process for obtaining pure gutta from the gutta-percha of different grades, which is produced in large quantities in this archipelago. As all of the gutta-percha thus far discovered in the Philippines contains a sufficiently large percentage of resin and other substances to make it of but medium or poor grade, the importance of this discovery will be readily appreciated. Chemical and physical tests applied to the pure gutta extracted from several of the Philippine gutta-perchas show it to be quite equal to the best Singapore gutta. Good rubber has also been found, and it is yet to be shown whether, with proper coagulating and drying, it will not equal the best Para rubber.

WORK OF THE BIOLOGICAL LABORATORY.

During the brief existence of the biological laboratory it has been called upon not only to do a very large amount of routine diagnosis, but to carry on work in connection with bubonic plague, cholera, rinderpest, surra, and amebic and other dysenteries, as well as a considerable number of other tropical diseases. The board of health, civil hospital, physicians, and other persons interested have shown their confidence in the results obtained in the laboratory by their constantly increasing calls for its services. I have elsewhere referred to the great importance of the work done in examining rats for bubonic plague, which I believe made it possible to stamp out that disease and avert a serious epidemic, thereby saving hundreds of thousands of dollars and many lives.

Upon the appearance of Asiatic cholera here the biological laboratory gave us a conclusive and final diagnosis in less than forty-eight hours after the discovery of the first case, thereby silencing to a considerable degree the popular outcry with which the radical measures adopted for the suppression of this disease in Manila were met, and encouraging the health authorities to persist in these measures, in the certainty that the logic of events would justify their action.

Many animal maladies, such as surra, glanders, farcy, and hog cholera have been diagnosed with certainty during their early stages, so that the saving of numerous animals has been possible. A new horse disease resembling glanders has been discovered. It can be readily and certainly diagnosed with the microscope, and is much less fatal than glanders; in fact, a large majority of the cases eventually recover. Undoubtedly numerous animals attacked by it have been killed within the past two years on the supposition that they were suffering from glanders. Needless destruction of animals which have this disease can hereafter be avoided by a simple microscopical examination.

The clinical work of the laboratory has included all of the examinations necessary for the Civil Hospital, San Lazaro Hospital, Bilibid Prison, and the various cholera hospitals. The examinations made include 361 of sputa, 173 of urine, 253 blood specimens for malaria, 74 serum reactions for typhoid fever, 115 blood counts, 1,142 for gonococci, 1,626 of feces, 976 for spirilla of Asiatic cholera, 15 for lymphangitis epizootica, 3 for glanders, 48 for surra, 6 for hog cholera, and 650 examinations, each involving a search for the following organisms: Ameba dysenteriæ, ameba coli, monads, strongyloides intestinalis, ova of trichocephalus dispar, ova of uncinaria duodenale, ova of ascaris lumbricoides, and of tænia.

Nineteen thousand seven hundred and sixteen doses of plague serum were also prepared at the biological laboratory prior to the establishment of the serum institute and delivered to the board of health.

Owing to the quarantine regulations and the restrictions placed by the board of health upon persons who had been in contact with cholera suspects, or who had been living in houses where cases of supposed cholera had occurred, it was most important, in order to avoid injustice, to have early and final diagnoses made, and the biological laboratory did this work in a very satisfactory manner. Autopsies were performed at first on all suspicious cases which resulted fatally. Later, when the number of dead greatly increased, autopsies were omitted on cadavers coming from hospitals where a positive diagnosis during life had been possible. More than a thousand autopsies were, however, performed, and a very large number of bacteriological examinations were made on material from living patients. One thousand one hundred and thirty-four cultures were made from food stuffs, water, clothing, etc., in an attempt to trace the process of cholera infection. The city water was kept under unremitting surveillance. Examinations were made upon flies, which demonstrated the existence of living cholera spirilla in the intestines of 13 out of 27 specimens twenty-four hours after feeding upon fresh cholera stools.

LOCUST FUNGUS.

Tubes of a fungus which produces an epidemic disease among locusts were received from Cape Colony and from Washington, D. C., in December, 1901, and cultures in large quantities were prepared for shipment to all the provinces of the archipelago, in many of which plagues of locusts were causing serious destruction. Great difficulty has been experienced in getting the Filipinos carefully to follow instructions in using the fungus. In many cases, either through neglect or through fear that persons eating the infected locusts might themselves become ill, it has not been used. Little by little, however, the prejudice against it is being overcome, and in a number of instances most satisfactory results have been reported. Very dry weather has proved an obstacle to infection. In one of the most strikingly successful cases of the use of the fungus, eight or ten locusts were captured, infected, and released at 4 o'clock in the afternoon on a plantation of the Philippine Sugar Estate Development Company, in the province of Bulacan. On the following day more than 30 cavanes (64 bushels) of dead locusts were found in the vicinity of the place where the infected locusts were released, and the remainder of the swarm had disappeared.

For a fuller account of the new building of the bureau of government laboratories, the equipment and library facilities which it will possess, and of the work of the chemical and biological laboratories, and of the serum institute, reference is made to the report of the superintendent of government laboratories, which is appended hereto and marked Appendix M.

PUBLIC LANDS.

Act No. 218 of the Commission, providing for the establishment of a bureau of public lands, was passed September 2, 1901, and on September 4 Mr. Will M. Tipton was appointed chief of this bureau. In view of the restrictions with reference to the sale or lease of public lands imposed upon the Commission by Congressional action, it was deemed impracticable to do more than attempt to get together the incomplete records with reference to public and private lands which remained in the government archives, and to systematically examine and classify them.

Considering the state of the records, good progress has been made in this work. Eight thousand four hundred and seventy-eight documents have been examined, abstracted, and entered upon a tabulated record. Some 20,000 documents, most of which are believed to be of slight importance, remain to be examined.

Act No. 218 provided for no clerical assistants except a chief clerk and made it incumbent upon the chief of the bureau to recommend a permanent form of organization and force of employees at the proper time. Señor Gregorio Basa, a lawyer who had acquired an intimate knowledge of the Spanish land laws during eighteen years of service as an employee of the Spanish government, was appointed chief clerk. The force of the bureau has since been increased by the addition of one clerk of class 8, one clerk of class 10, two clerks of Class I, and a messenger.

Since June 2, 1902, on which date the chief of the bureau of public lands was authorized by executive order of the acting civil governor to issue certified copies of documents bearing upon land titles, 28 certified copies, aggregating 43,168 words, have been issued by him.

Numerous inquiries in regard to the taking up of public land have been made by Americans who signified their intention of remaining in the islands and devoting themselves to agriculture. Many of these men, who were possessed of but limited means, have been discouraged by their inability to secure titles and have left the islands, a fact which is greatly to be regretted.

The chaotic condition of land titles which at present exists, due to the wanton destruction of many important government records by Spanish officials shortly before the downfall of Spanish sovereignty in these islands, to the loss of important documents through the vicissitudes of war, to the mutilation of existing records caused by evil-intentioned persons or by insect pests, and to the rapid deterioration which documents undergo in this climate if left uncared for, makes it most necessary that legislative action should be taken in the near future which will allow of the establishment and registration of land titles. A bill providing for the adjudication and registration of titles has been drafted by the honorable the secretary of finance and justice, and will soon be considered by the Commission.

In view of the present state of titles and of the obstacles presented by natural conditions, the satisfactory surveying of the public domain of these islands will be a difficult task. It is hoped that an arrangement can be made with the Director of the Geological Survey of the United States by which a system of rectangular surveys similar to that in the United States can be combined with the geological survey of these islands.

LEGISLATION RECOMMENDED.

In section 15 of the recent act of Congress the government of the Philippine Islands is authorized and empowered, on such terms as it may prescribe by general legislation, "to provide for the granting or sale and conveyance to actual occupants and settlers and other citizens of said islands such parts and portions of the public domain, other than timber and mineral lands, of the United States in said islands as it may deem wise, not exceeding sixteen hectares to any one person, and for the sale and conveyance of not more than one thousand and twenty-four hectares to any corporation or association of persons," under certain general conditions prescribed in this and the following section.

I strongly urge that the Commission recommend to Congress that the provisions as to the amount of land which may be sold to an individual or a corporation or association of persons be made much more liberal.

In discussing agricultural possibilities here I have invited attention to the favorable opportunities afforded by the soil and climate of this archipelago to young men of limited means desirous of engaging in agriculture, but the success of such ventures is obviously dependent upon ability to secure sufficient land. In cocoanut growing, for instance, the trees thrive in sandy soil along the sea, barely above high-water mark, on land which, so far as we at present know, is absolutely useless for any other purpose than cocoanut growing, but not more than 75 trees can be advantageously planted to the acre. If one were to take up the maximum of 16 hectares and were able to utilize all of it for planting cocoanut trees, he would be able to put out less than 1,900 trees—a number which would not justify him in engaging in the cocoanut business. If this is true of cocoanut growing, which does not necessitate the installation of any machinery, it is much more true of sugar growing. A 40-acre sugar plantation would be ridiculous, and the same statement would hold for a rice or abaca plantation of similar dimensions. If the present limitation upon the amount of public land which may be sold to an individual be not removed, the inevitable result will be that the sale of public lands to individuals desiring to cultivate upon a commercial scale sugar, hemp, tobacco, coffee, indigo, or cacao will be prevented, and those who wish to engage in any of these industries will be compelled to purchase land from persons who secured title under Spanish sovereignty, with the result that there will be little increase in the acreage which now is, or recently has been, under cultivation.

I see no good reason for imposing a severer restriction upon an individual as to the amount of land which he may purchase and cultivate than is imposed upon a corporation.

If the Filipino is ever to adopt modern agricultural machinery and to employ advanced methods of cultivation, it will be only as the result of practical demonstration of the advantages of such a course. Everyone who knows him fully realizes that it is useless to attempt to argue him into giving up the methods which his forefathers have followed for generations, but he is not slow to recognize a good thing if he can see it. The educational value to these islands of large estates under high cultivation would be very great.

We are now compelled to import large quantities of rice, while there are thousands of acres of the finest rice lands along the line of our one railway which have never yet been touched by the plow; and if this state of affairs is to be remedied, these lands must be sold or leased on long terms in large tracts.

The small landowner should certainly be protected, and Congress has done well to safeguard his interests; but in order to achieve this end it is by no means necessary to impose restrictions which can only result in leaving enormous areas of rich agricultural Government lands uncultivated in the future, as they are to-day.

These islands have no manufactures of great importance, and if the balance of trade, which is to-day heavily against them, is to be turned in their favor, it must be through the sale of the products of their forests, their mines, and their agricultural lands. If these products are to be materially increased in quantity and improved in quality, it must be by encouraging the investment of capital upon a basis which affords reasonable hope of good returns.

I believe that the individual should be treated as liberally as the corporation in the matter of the amount of Government land which he may purchase, and that the limit should be not less than 15,000 acres.

If it is not deemed advisable for the Government to part with title to large tracts of public lands, the Commission might be authorized to lease such tracts for periods of fifty years, and in that event the limit should be increased to 25,000 acres.

For further information concerning public lands, reference is made to the first annual report of the chief of the bureau of public lands, which is appended hereto and marked "Appendix N."

PRESENT STATE OF AGRICULTURE.

The inhabitants of the Philippines are essentially an agricultural people. The islands produce few manufactures of importance, and their wealth has in the past come very directly from the products of the soil. Agriculture has, nevertheless, up to the present time been carried on in a very primitive fashion, with rude implements and antiquated machinery, and without the use of fertilizers or the employment of suitable methods of cultivation. The results which have been obtained under such conditions afford proof of the favorable character of the climate and the natural richness of the soil, which in many places seems to be practically inexhaustible, but rank tropical vegetation speedily invades lands that are left uncultivated, and the disturbed conditions incident to six years of intermittent warfare have operated disastrously in favoring or compelling the abandonment of large tracts of cultivated land.

One of the terrible epidemics of rinderpest which have from time to time invaded the Philippines has recently swept over the archipelago, and the statement that 75 per cent of the horned cattle have been destroyed by this disease and by war would probably be conservative. The Filipino horses are too small to be of use in heavy field work, nevertheless they are of great value in packing or hauling agricultural products to market. Glanders has spread widely among them, and within the past year surra, a very fatal disease, has also made its appearance, and has caused serious losses not only among native horses, but among the American horses and mules as well. The result is that the people in many provinces are badly hampered by lack of draft animals, and are obliged to leave a considerable part of their land uncultivated. I believe that the problem of restocking these islands with draft animals is one of the most serious which we are at present called upon to face. Many of the provincial governments have expressed a desire to use provincial funds for the bringing in of horned cattle. They also desire to import jackasses in the hope of being able to cross them successfullly with the native mares and breed mules. Some importations of horned cattle have recently been made by private individuals, but practically without exception the animals thus brought in have contracted rinderpest. The serum institute, however, is now manufacturing an antirinderpestic serum, inoculation with which confers a high degree of immunity for a period of several years, and importations of horned cattle can be made with every reason to expect success. Fortunately, there are still a few islands which have not been visited by rinderpest, and every effort will be made to protect the cattle that are left.

THE BUREAU OF AGRICULTURE.

On October 8, 1901, act No. 261, providing for the establishment of a bureau of agriculture, was adopted, and the Secretary of Agriculture of the United States was requested, through the Secretary of War, to recommend a suitable person for appointment as its chief. Pending the receipt of his recommendation, a very limited amount of work was carried on under my direction. A considerable number of Government farms and experiment stations were said to have been established under the Spanish Government, but little actual information was available as to the extent of land included in each, the character of the soil, the crops which could be raised to advantage, possibilities as to water power and irrigation, the existence of buildings, machinery, or agricultural implements on the several farms and stations, and the state of such buildings as were known to exist. Therefore I appointed Mr. Michael R. Healy, who was recommended for this position by Dr. S. A. Knapp, special commissioner of the United States Department of Agriculture, a special agent to visit these abandoned Government farms and experiment stations and to report fully upon each of them.

In general, it was found that buildings, where any had ever existed, had been destroyed or had greatly deteriorated, and that farm machinery, tools, etc., had been stolen or scattered, or had become useless through neglect. In some instances tracts of land selected by the Spanish Government were found to be well suited for the purposes for which they were intended, while in other cases they were so badly situated as to suggest the advisability of their final abandonment.

At San Ramón, in the district of Zamboanga, island of Mindanao, distant some 15 miles from the town of Zamboanga, the Spanish Government maintained a penal colony where convicts were employed to cultivate an extensive tract of land. This farm was occupied by the United States military authorities not long after the landing of American troops at Zamboanga, and an old sawmill situated upon it was temporarily repaired and used for getting out lumber needed by the Army. Something was also done toward gathering and marketing cocoanuts and abacá (manila hemp), which were growing on the farm in considerable quantity. On September 27, 1901, the civil governor was informed by General Davis that the Army was about to abandon this farm. General Davis stated that it could be leased for $5,000 gold per year, and recommended that this course be pursued, but it was decided by the Secretary of War, under the then existing Congressional legislation, that the Commission was without authority to lease the property.

Mr. George M. Havice, a gentleman of considerable experience in the conducting of large estates, was appointed superintendent of the farm, and a suitable appropriation was made for conducting it. There is no land communication between San Ramón and Zamboanga, and the isolated position of the farm made it difficult to get labor. Plantations of cocoanuts, abacá, and cacao had been left for years without cultivation, the machinery and buildings had deteriorated for lack of care, and conditions in general were very discouraging. Mr. Havice has displayed great energy in his work, and present indications are that the San Ramón farm will soon produce a considerable revenue.

Upon the recommendation of the Secretary of Agriculture of the United States, Mr. F. Lamson-Scribner, who had held the position of chief agrostologist in the Department of Agriculture at Washington, was appointed chief of the insular bureau of agriculture on November 29, 1901, and was instructed to secure agricultural machinery, farming tools, and seeds of American vegetables and field crops, and to visit places in the United States where practical information likely to be of value to him in his future work could be obtained before sailing for these islands.

The United States Department of Agriculture furnished him with a large and valuable consignment of seeds for experimentation and distribution, together with a fine set of lantern slides, an extensive collection of botanical specimens, and many important publications, thus enabling the bureau to enter the field well equipped for work. An act organizing the bureau of agriculture was passed on April 30, 1902. In addition to the chief of the bureau, it provided for an expert in animal industry, a botanist and assistant agrostologist, a soil expert, a tropical agriculturist, an expert in plant culture and breeding, and an expert in farm machinery and farm management, and for the necessary clerical assistants. It also made the superintendent of the San Ramón farm an employee of the bureau of agriculture.

On July 14, 1902, the working force was increased by the addition of an expert in seed and plant introduction and an expert to conduct fiber investigations.

The first practical work of the bureau was to get in touch with the more intelligent and progressive persons interested in agriculture in these islands, through the medium of circular letters, which were addressed to the provincial governors and the presidents of the several municipalities, asking for information relative to the soil and agricultural products of the territory under their respective jurisdictions, and requesting addresses of persons likely to be interested in the work of the bureau and in the improvement of agricultural conditions in general. A mailing list of nearly a thousand names was thus secured.

Eighteen thousand two hundred and fifty packages of field and garden seeds, including 134 varieties, have been distributed to 730 individuals, many of whom have shown a lively interest in the result of the experiments which they are thus enabled to make. While it is too soon to make a full statement as to the outcome of this effort to introduce new vegetables, fruits, and farm crops, the results thus far reported are decidedly encouraging. There seems little doubt that great good can be accomplished by this means, and that a number of new and valuable plants can be successfully introduced. The better varieties of tomatoes grow well throughout the islands. Fairly good Irish potatoes and peas have been grown in the lowlands near Manila from American seed; and very fine potatoes, celery, and peas have been raised from American seed in Benguet. Beets do well in the lowlands, and radishes are ready for the table in three to four weeks after planting. Improved varieties of orange and lemon brought from California are flourishing, both in the lowlands and in the mountains of Benguet, while pear, peach, apricot, and plum trees have been successfully introduced in the latter region.

An effort is now being made to secure seeds of the economic plants of the islands for experimental cultivation with a view to improvement. These islands have heretofore produced no grapes, with the exception of a very limited quantity grown in the city of Cebu. The agricultural bureau has recently discovered a new species of wild grape in the island of Negros, the improvement of which by proper cultivation may lead to results of considerable economic importance. Vanilla is said to grow wild on Mount Banajao, in Laguna Province.

The botanist of the bureau, who also acts as botanist for the forestry bureau, has already collected a considerable amount of valuable botanical material, and has gone to the famous botanical gardens at Buitenzorg, Java, for the purpose of identifying it, the destruction by fire in 1897 of the large Spanish collections identified by Vidal and of the fine reference library which formerly belonged to the Spanish Government having rendered it impossible successfully to carry on such work at Manila at the present time.

I desire to express my appreciation of the treatment that has been accorded representatives of this government by the Dutch authorities at Buitenzorg, who not only extended every courtesy to Dr. Sherman when he visited Java to investigate rubber and gutta-percha, but offered to place the facilities afforded by their wonderful botanical gardens, their extensive laboratories, fine reference library, and large and complete herbarium at the disposal of any person whom we might desire to send to carry on further work there.

SOIL INVESTIGATION.

Mr. Clarence W. Dorsey, soil physicist of the bureau, has been making a preliminary survey of the soils of the regions which at present produce the best abacá, and at the request of the governor of the province of Union, in this island, is now investigating the soils of that province in order to determine whether abacá can be successfully grown there. Union has a long, narrow strip of level, fertile land extending from 1 to 5 or 6 miles back from the seashore and reaching from one end of the province to the other. The remainder of the province is occupied by steep hills and mountains, which at present produce only a little mountain rice and a few sweet potatoes. Should it prove, as seems probable, that abacá can be successfully raised on the slopes, the wealth of the province will be greatly increased. Similar work will be carried on in other provinces, and it is believed that the important results which have followed soil investigations in the United States can be equaled or exceeded here.

FIBER INVESTIGATIONS.

But two vegetable fibers are at present exported from the Philippines, namely, abacá and maguey, the latter in insignificant quantities. The value of abacá exports is 62.5 per cent of the total value of the exports of the archipelago. Fifty-two fiber-producing plants are at present known to exist here, and others doubtless remain to be discovered. The investigation of the fiber-producing plants, with a view to ascertaining the economic value of the several fibers and the best means of cultivating those plants which produce fibers of commercial importance, has begun, and a preliminary report on the commercial fibers of the Philippines will soon be issued in pamphlet form.

WORK IN BATANGAS PROVINCE.

Practical work on a large scale has been made feasible in the province of Batangas by the hearty cooperation of Gen. J. Franklin Bell, who has shown the keenest interest in promoting the agricultural development of this province by furnishing transportation and directing the cooperation of the army officers of the several posts in the inauguration of practical experiments in the use of American agricultural machinery and the growing of alfalfa, teosinte, cotton, tobacco, and sugar cane under modern methods of cultivation.

Batangas was formerly a rich agricultural province, sugar and coffee being its principal products. Some ten years ago its valuable and extensive coffee plantations were practically annihilated by a borer. Most of the carabaos have died of rinderpest, and from 1896 until April of the present year the province has been the theater of active military operations which have kept the people from properly cultivating the soil, with the result that little is grown there at the present time except mountain rice, and the once important agricultural interests are practically prostrated. The people are relatively intelligent and progressive, and it is believed will profit by the practical experiments now in progress, which are conducted in such a way as to attract the attention of those who are most vitally interested in their results. There are a considerable number of people in this province who have the necessary means for the purchase of modern agricultural machinery and good draft animals, and it is hoped that by the introduction of new crops and the demonstration of the value of improved methods of cultivation this province may in the not distant future be made more prosperous than it ever has been.

FARMERS' BULLETINS.

With a view to improving the methods of cultivation now in vogue, the publication of a series of farmers' bulletins is projected. A bulletin on the cultivation of sugar cane has already been issued and has been appreciatively received and widely read. A second bulletin on the cultivation of cacao, which has been raised thus far in insignificant quantities, but which might form an important export, is in preparation and will be issued in the near future.

EXPERIMENTAL WORK AT BAGUIO, BENGUET.

It may well be doubted if any region in the world offers such unexcelled advantages for experimental work with plants as are presented by the climate and soil in the vicinity of Baguio. The climate admits of the growing of a great variety of tropical, subtropical, and temperate-zone plants. In the gardens of the governor one may see coffee bushes bearing heavily, fine tea plants, hot-house gardenias, caladiums, dracænas, frangipani, and mango trees, all characteristic of the Tropics; alsophila tree ferns, scarlet hibiscus, passion fruit, begonias, hydrangeas, and many other plants of the subtropical regions; and side by side with these potatoes, tomatoes, peas, beans, celery, and other garden vegetables and monthly roses, all strictly temperate-zone products, while the neighboring hillsides are covered with pine trees and produce raspberries and huckleberries in considerable abundance.

With reference to the red volcanic soil which covers large areas in Benguet and which has been considered practically worthless, Mr. Thomas Hanley, the expert of the Agricultural Bureau in plant culture, says:

> The soil of the slopes and hills is composed of a red volcanic clay loam of great depth. * * * There was something familiar to me about this red soil, as well as the surrounding hills and valleys. They suggested the soil and scenery of a place called Mount Gambier, in South Australia, seen by the writer many years ago. The soil there, as here, is of volcanic origin, and in the early days of occupation in that colony the fertility of the red clay soil escaped notice. Someone, however, started cultivation and the result was surprising. Like Benguet, the climate there is quite different from that of the lowland country. Potatoes can not be grown in the hot plains of Australia. They were tried here (Mount Gambier) and the yield was enormous. It was the same with onions. In a short time there was a rush for land, and what could be obtained for $10 an acre previously quickly brought $150. Mount Gambier, in a couple of years, became famous for its wonderful crops, and since than has shipped its products to all parts of the country. The only difference I can see in the soil here (at Benguet) is that it is more tenacious in character, but not sufficiently so to prevent ready drainage.

Experimental work was begun at Baguio by Mr. Hanley at the most unfavorable time, namely, just at the beginning of the rainy season. Cabbage, tomatoes, onions, leeks, carrots, turnips, parsnips, beans, peas, cucumbers, marrow, squashes, pumpkins, salsify, Irish potatoes, white oats, wheat, millet, and alfalfa were sown. All of them germinated quickly, and there was nothing to show that the soil was deficient in plant food. The experiments at Baguio will be continued through the coming year.

AGRICULTURAL OPPORTUNITIES IN THE PHILIPPINES.

It is hardly necessary here to discuss the agricultural opportunities offered in these islands to corporations or individuals possessing large capital and able to cultivate upon an extensive scale such crops as sugar, hemp, and tobacco. But a small part of the soil capable of producing these crops to advantage is at present under cultivation. The methods of extracting sugar now used leave approximately 50 per cent of the sugar in the pressed cane when it is thrown on the dump pile. Hemp is cultivated in a haphazard way, where it is not allowed to grow practically wild, and the fiber is extracted by hand. No systematic and sustained effort has ever been made to improve the quality of Philippine tobacco, and the methods used in curing it are very primitive. If rich returns have been realized from the growing of these commodities in the past upon a comparatively limited scale, the results of extensive cultivation with modern methods and machinery are too evident to require discussion.

I desire to call especial attention to the opportunties here afforded young men of comparatively limited means to engage profitably in agriculture.

There are very large areas of government lands admirably adapted to the cultivation of cocoanuts. Cocoanut trees come to bearing in from five to seven years, reaching the bearing stage more slowly as the altitude increases. The trees can be grown readily and with comparatively little danger of loss. Under existing conditions, the minimum annual profit from a fairly good bearing tree is $1 Mexican, and frequently two or three times this amount is realized. The ground under the trees is now either allowed to grow up with brush or is kept clear by hand. The growth of underbrush injures the soil and leads to the loss of falling nuts, while clearing by hand is quite expensive. The use of mowing machines would result in a great saving in the cost of labor necessary to keep the ground clear and gather the nuts. Other crops, such as Indian corn and alfalfa, can be grown between the rows of cocoanut trees while the latter are maturing, and used to fatten hogs, which always bring a good price in the Philippine market. The demand for copra in these islands is greatly in excess of the supply and is steadily increasing, while cocoanut oil now sells readily in Manila at $1.25 Mexican per gallon.

The lands along the coast of Mindanao and Paragua are particularly favorable to cocoanut growing, and in the latter island trees are said to come to bearing in four years.

Mr. Lyon, the expert tropical agriculturist of the agricultural bureau, informs me that in no other country has he seen climate and soil so favorable to cacao growing as in Mindanao. The cacao now produced in that island is of superior quality and is nearly all bought up for shipment to Spain, where it brings an especially high price. There are numerous other regions in the islands where cacao can be raised to great advantage, but it is hardly too much to say that there is not to-day a cacao plantation in the archipelago, the Filipinos having almost invariably contented themselves with planting a few scattering bushes, which are left practically without care, to be swamped by brush and preyed upon by insects. Proper harvesting and curing methods are not employed. The fruits are torn from the bushes, injuring the bark and leaving the way open for the attacks of injurious insect pests.

An especially fine coffee is grown in the mountain regions of Benguet and Bontoc and in the province of Lepanto. The bushes yield heavy crops and the unhulled coffee at present sells readily in Manila at $35 Mexican per cavan, for consumption in these islands or for shipment to Spain. Coffee bushes come to bearing in Benguet in three years. There is no region in the United States which has a more healthful or delightful climate than is afforded by the Benguet highlands, where a white man can perform heavy field labor without excessive fatigue or injury to his health.

It is almost impossible to secure in Manila the milk needed by the sick. Fresh milk sells for 75 cents Mexican per wine quart. A dairy on the outskirts of the city, with 95 animals, including several bulls, was netting $5,000 Mexican per month when the animals were attacked by rinderpest.

During the first eight months of 1902 there were cleared through the custom-house 14,071 head of beef cattle, valued at $406,113 United States currency, and for the same period there were imported fresh meats, such as beef, mutton, and pork, to the amount of 846,901 pounds, valued at $47,906 United States currency. At this rate we are importing into Manila fresh meat to the value of $609,664 per annum, exclusive of that used by the Army and Navy.

Native cattle are at present worth $30 to $50 Mexican per head in Manila, and native grass-fed beef sells for 40 to 60 cents Mexican per pound. The pastures of Benguet, Lepanto, and Bontoc afford one vast well-watered cattle range, where there is little doubt that improved breeds of horned cattle could be successfully introduced, while in the lowlands there are vast stretches of grazing lands suitable for raising cattle and carabaos. The latter are at present worth $150 to $300 Mexican per head in the Manila market. Properly conducted cattle ranches will certainly yield very handsome returns.

The present cholera epidemic is believed to have been due to infected vegetables imported from China. The Chinese system of manuring growing vegetables is such as to make vegetables from that country always a source of danger to the public health, and it is important that we should have our own truck farms as soon as possible. As already stated, experience has shown that a considerable variety of vegetables can be successfully grown in the lowlands from improved American seed, and such vegetables command a ready sale at a high price in the larger cities.

Excellent native oranges are produced in the province of Batangas, in the Calamianes Islands, and elsewhere. The trees, which are often large and vigorous, seldom receive any care, nor has any systematic effort been made to improve the quality of the fruit, which sells readily at a good price. There is every reason to believe that improved citrus fruits can be successfully introduced.

Numerous new industries, such as the raising of vanilla in the lowlands and the cultivation of fruits and vegetables peculiar to the temperate zone in Benguet, ought, if properly conducted, to result profitably. Communication between Benguet and Manila is at present slow and unsatisfactory. Great difficulty has been experienced in constructing a carriage road from Baguio, the capital of the province, to Pozorubio, in the province of Pangasinan, from which point there is a highway to Dagupan, but a good horse trail will probably be completed over the 12 miles of unfinished road within four or five months, and fairly quick communication can then be had with Manila by way of Dagupan and the railway.

FUTURE WORK OF THE BUREAU OF AGRICULTURE.

The practical work of the bureau of agriculture will be pushed as rapidly as possible. An experimental station for the testing of seeds and the growing of introduced plants and trees has been established within the limits of the city of Manila, where it can be conducted under the immediate direction of the chief of the bureau, and where the results obtained can be seen by a large number of people. An experiment station for the growing of rice upon a large scale will be established near the center of the great rice-producing area extending from Manila to Dagupan. Other experiment stations will be established as those already provided for are put upon a paying basis. Appropriation has just been made for an extensive stock farm for the introduction and breeding of draft and dairy animals. Provincial boards have been authorized to expend provincial funds for the purchase of draft animals for breeding purposes, with a view to restocking the several provinces with animals which have in the past proved useful and with others which can be profitably introduced. The insular purchasing agent and the chief of the bureau of agriculture have been directed to aid provincial boards in securing suitable animals. The Commission is about to authorize the use of government funds for the importation of draft animals to be sold on easy terms in the provinces where they are most urgently needed. The success of this effort to restock the islands with draft animals at the present time is absolutely dependent upon the ability of the serum institute to turn out a satisfactory antirinderpestic serum in sufficient quantities, and no effort will be spared to bring the work of the institute to a high degree of efficiency. The examination of the soils of the more important agricultural provinces will be pushed as rapidly as possible, and the results of the work of the bureau of agriculture will be made known by means of bulletins for the benefit of persons resident in these islands and of those who may desire to come here and engage in agriculture.

For a fuller account of the work already accomplished reference is made to the first annual report of the chief of the bureau, which is appended hereto and marked "Appendix O."

WEATHER BUREAU.

The work of the weather bureau has progressed very satisfactorily during the past year. Thirty-five new stations have been established. Of the 72 stations provided for in the act creating the weather bureau, all but 21 are now in working order.

Difficulty was experienced in many instances in finding suitable buildings for the installation of meteorological instruments, and act No. 368 was accordingly passed, making it obligatory upon provincial and municipal governments to provide suitable quarters for stations of the weather bureau, such quarters to be in the provincial or municipal buildings, if practicable, and otherwise in buildings rented or constructed for the purpose at the cost of the province or of the municipality. The stations now established cover a very large area, especially in latitude, the southernmost lying in latitude 6° 3′ north and the northernmost in latitude 20° 25′ north.

The weather predictions and storm warnings at Manila, which, under the able management of Father Algué and his predecessors, have been good for many years, have become more accurate as the establishment of new weather stations has made available additional observations from important points. Predictions and warnings are now published at all stations of the weather bureau which are in telegraphic communication with Manila.

One great obstacle to successful work is the frequent failure of the telegraph lines during typhoon weather, when they are most badly needed. Many of the lines were built hastily for military purposes. Poles were often selected with a view to quick construction rather than durability and were set while green. When of soft wood they are attacked by white ants, and if set green they soon decay, so that heavy winds cause frequent breaks in the lines. As the present poles are replaced with better ones of hard wood or of metal this difficulty will doubtless disappear to a considerable extent, but lines running for long distances through forest will always be broken during typhoons by falling trees and branches. The rapid extension of cable lines, which are much less subject to breakage, has been of the greatest service to the weather bureau.

NEW APPARATUS.

The apparatus at the central station at Manila has been increased by the addition of a Vicentini's universal microseismograph and a ceranograph for the recording of flashes of lightning.

CROP SERVICE.

The inauguration of a crop service in connection with the weather service has begun and is progressing satisfactorily.

REPORTS.

The annual report of observations for the calendar year 1900 was published at the close of 1901, and a similar report for the year 1901 was issued in August, 1902. Apart from the monthly weather bulletins, which have appeared regularly, there was also issued in June, 1902, an exhaustive and most interesting report on the climate of Baguio, in the province of Benguet, embodying observations extending over the period from September 1, 1900, to September 1, 1901.

A pamphlet entitled "Ground Temperature Observations at Manila, 1896–1902," has recently been published, and copy for another pamphlet entitled "Report on the Seismic and Volcanic Centers of the Philippine Archipelago" has been sent to the Public Printer.

ASTRONOMICAL AND MAGNETIC WORK.

The weather bureau furnishes standard time daily by telegraph to all telegraph offices throughout the archipelago. Standard time is also furnished at noon to the shipping in the harbor at Manila by means of a time ball displayed at the observatory building, and to the business center of the city by a gun on Fort Santiago, which is fired from the observatory by electricity.

For further information in regard to the work of the weather bureau, reference is made to the report of the director, which is appended hereto and marked "Appendix P."

BUREAU OF NON-CHRISTIAN TRIBES.

Pagan or Mohammedan tribes are found in Luzon, Mindanao, Panay, Negros, Samar, Mindoro, Basilan, the Sulu Archipelago, Balabac, Palawan, and the Calamianes Islands. The number of these peoples has been only roughly guessed at, and there is a lamentable lack of accurate information in regard to them upon which to base intelligent legislation. Their presence and the existence among them of head-hunting, slave hunting, polygamy, and other objectionable practices create serious problems for the insular government. With a view to investigating their actual condition and to the conducting of scientific investigations with reference to the ethnology of the Filipinos, a bureau of non-Christian tribes was created by act No. 253 on October 2, 1901. A skeleton organization, consisting of a chief of the bureau, one clerk, and an agent for Moro affairs in the Jolo Archipelago, was provided, and it was made incumbent upon the chief of the bureau at a later date to recommend a permanent organization. Dr. David P. Barrows, who was at that time employed in the bureau of public instruction as superintendent of Manila schools, and who was particularly fitted by his special studies in ethnology at the University of Chicago and by his practical field work among the Indians of the western United States for this position, was appointed chief of the bureau, and in December was directed to go to the United States, confer with Government officials at Washington, and visit Indian reservations and schools, with a view to the gathering practical information which would be of aid to him in his work here. Meanwhile the work of the bureau was left in charge of the chief clerk. Dr. Barrows returned from the United States in May.

In order to secure further information as to the number, names, and habitats of the wild tribes, and to learn the names of persons who could give more or less accurate accounts of them, I prepared a circular letter of inquiry prior to the organization of the bureau. This letter was sent by the bureau to every provincial governor and to the president of every organized municipality in the archipelago. Some 900 replies have been received, and the work of tabulating the information therein contained has been very considerable.

A syllabus for the study of the non-Christian tribes is nearly ready for publication. The working force of the bureau has been increased by the addition of an assistant chief, two clerks of class H, one employee at $180 per annum, and one employee at $90 per annum. Dr. Albert E. Jenks was appointed assistant chief. Dr. Barrows and Dr. Jenks are at present engaged in field work among the little-known wild tribes of northern Luzon.

A considerable amount of valuable ethnological material has been gathered and is being cared for by employees of the bureau pending the securing of suitable facilities for exhibiting it. The collector and assistant collector of natural-history specimens are also temporarily included among the employees of the bureau of non-Christian tribes for purposes of administration.

When the work at present in progress in northern Luzon has been concluded it is purposed to transfer the entire field force of the bureau to the island of Mindanao, with a view to the gathering of data which may be useful in the solution of the serious problems presented by the numerous Mohammedan and pagan tribes of that island.

For further information with reference to the work already accomplished by the bureau of non-Christian tribes and that contemplated in the future, as well as for a brief review of Philippine ethnology, reference is made to the report of the chief, which is appended hereto and marked "Appendix Q."

Very respectfully, DEAN C. WORCESTER, *Secretary.*

APPENDICES.

APPENDIX A.

REPORT OF COL. L. M. MAUS, COMMISSIONER OF PUBLIC HEALTH, FOR THE PERIOD FROM SEPTEMBER 1, 1901, TO JULY 31, 1902.

MANILA, P. I., *July 31, 1902.*

The honorable Secretary of the Interior.

SIR: I have the honor to submit herewith my annual report for the period ending July 31, 1902.

A very large amount of work has been done by the board of health during the past year. In this report will be shown the large number of regular and special meetings held and the many resolutions framed and adopted by the board.

During this year there has been an epidemic of bubonic plague, which was successfully controlled.

In March, 1902, cholera made its appearance in Manila, and from thence spread into the provinces, and from Luzon to the other islands. This has necessitated the employment of a large number of men, a large expenditure of money, and incessant work on the part of all connected with the department.

We feel that while it has been impossible to suppress the disease, as has been true in epidemics of cholera in other oriental countries, it has been controlled in a large measure, and by vigilance and steady work a repetition of the experience of 1882 has been prevented at Manila. A report of this epidemic will be found on page 341. This report is not complete, as cholera is still with us, although apparently decreasing in number of cases and virulence. A full corrected report will be submitted as early as may be possible after the disappearance of cholera in these islands.

THE ORGANIZATION OF THE BOARD OF HEALTH FOR THE PHILIPPINE ISLANDS AND CITY OF MANILA.

The board of health for the Philippine Islands was organized by act 157, United States Philippine Commission, which was enacted July 1, 1901, but did not go into effect until August 7 of that year.

Previous to the enactment of this bill the board of health for the city of Manila was under the jurisdiction of the provost-marshal-general, and consisted of military surgeons, with civilian subordinates.

From the year 1888 until the American invasion health matters in the city of Manila were administered under the department of charities and health, a bureau of the civil government created in that year, whose chief held the position of a third-class official. The principal duties of this office were to superintend the work of provincial physicians, to see that they were properly qualified, to superintend public vaccinations, and to look after municipal physicians. At this time there were 13 municipal physicians, who attended to the poor. Their salary was 50 pesos per month, and out of this they were required to pay an income tax of 5 per cent. In addition to their salaries, however, they had a revenue from fees charged the wealthy classes for death certificates.

Little or no attention was paid to sanitation, and except for the introduction of the present water supply and the closure of several esteros in the city nothing was done toward improving the public hygiene or the general health. The sanitary condition of the city of Manila at the date of American invasion resembled that of European cities in the seventeenth century.

The installation of the water system was due to the generosity of Señor Carriedo, a wealthy Spanish physician, who devoted his entire fortune to this worthy cause. The project was stimulated by the terrible epidemic of cholera which occurred in Manila in 1871, and which swept off thousands of its citizens. Before the introduction of this system the water supply for the entire city was derived from superficial wells or taken from the Pasig River in the vicinity of the Hospicio de San Jose. A few of the wealthier classes owned cisterns, and thus many of them escaped filth diseases.

PERSONNEL OF THE BOARD OF HEALTH AND DATES OF APPOINTMENT.

Lieut. Col. L. M. Maus, deputy surgeon-general, U. S. Army, the first commissioner of public health for the Philippine Islands, was detailed by the Secretary of War, at the request of the civil governor and the Commission, July 26, 1901.

Maj. Franklin A. Meacham was appointed chief health inspector August 9, 1901, and died April 14, 1902. He was succeeded by Maj. Frank S. Bourns, who was appointed April 21, 1902, holding the office until the date of his resignation, June 27, 1902, since which time the office has been vacant.

Prof. Paul C. Freer, superintendent of government laboratories, and member of the board ex officio, was appointed August 9, 1901.

Capt. C. W. Mead, sanitary engineer board of health, was appointed by the Commission August 9, 1901, and resigned March 15, 1902, resignation not taking effect until April 1, 1902. He was succeeded by Capt. Robert McGregor, Corps of Engineers, U. S. Army, who was appointed May 30, 1902.

Dr. Manuel Gomez, secretary of the board, was appointed August 9, 1901.

Mr. H. D. Osgood was appointed assistant sanitary engineer on December 7, 1901, but is without vote at board meetings.

In addition to the members of the board the following assistants were appointed: 7 municipal physicians, 12 chief sanitary inspectors, 60 sanitary inspectors (natives), together with the personnel of the main office, San Lazaro hospital, morgue, and vaccine and serum institutes.

DETAILED WORK OF THE BOARD OF HEALTH DURING THE YEAR, HEALTH MEASURES FORWARDED TO THE COMMISSION FOR LEGISLATIVE ACTION, AND RESOLUTIONS SENT TO THE MUNICIPAL BOARD FOR THE FORMATION OF CITY ORDINANCES.

At the first meeting of the board of health, which was held on August 12, 1901, the following rules and by-laws for the regulation of the board of health for the Philippine Islands were adopted:

"*Rules and by-laws for the regulation of the board of health for the Philippine Islands.*

"MEETINGS.

"1. The regular meetings for the board of health for the Philippine Islands shall be held on the second and fourth Tuesdays in each month, at 3 o'clock p. m. Should there be any unfinished business, or any special work in view, another meeting will be called then and there. A majority of the members entitled to vote shall constitute a quorum for the transaction of business. Parliamentary rules shall govern the meetings of this board.

"2. Special meetings may be called at any time by the commissioner of public health, or upon the request of three of the members authorized to participate in the meetings of the board.

"3. Seasonable notice of all meetings of the board shall be given personally by telephone or by mail.

"4. The commissioner of public health shall appoint permanent committees.

"5. Special committees may be appointed on any subject by the commissioner of public health. These committees may be composed of one or more members.

"ORDER OF BUSINESS.

"6. The order of business to be observed at the meetings of the board shall be: (*a*) Reading of the minutes; (*b*) reports of the permanent committees; (*c*) reports of special committees; (*d*) reports of the commissioner of public health; (*e*) miscellaneous reports and communications; (*f*) unfinished business; (*g*) new business; (*h*) adjournment.

"OFFICIAL COMMUNICATIONS.

"7. A book shall be kept for filing all communications received and copies of letters sent.

"AUTHENTICATIONS.

"8. Except in the cases where a different mode of authentication is required by law, all copies of communications or official papers made by this board may be authenticated by adding to a copy of such communication or official paper the words, 'a true copy,' and by the signature thereunder of the name of the commissioner of public health.

"REMOVALS.

"9. The removal of any assistant or employee of the board of health for the Philippine Islands shall not be made except by the commissioner of public health, and in accordance with the law and the regulations of the civil-service bureau.

"10. Each assistant and employee of the board of health for the Philippine Islands shall perform whatever work may be assigned to him by the commissioner of public health, and within the scope and powers of the board of health.

"OFFICE HOURS.

"11. The following office hours will be observed by all officials, clerks, and employees in the office of the board of health:

"*Week days.*—Forenoon, 8 to 12; afternoon, 2 to 5.

"*Sundays.*—Forenoon, 9 to 12; afternoon, 2 to 5.

"The following clerks, officials, and employees will be required during the morning hours of each Sunday: 1 medical inspector, 1 clerk, 1 clerk for burial permits, stenographer.

"The following officials, clerks, and employees will be required Sunday afternoons: 1 medical inspector, 1 burial permit clerk.

"12. All employees will be required to report promptly, and be on duty in the office of the board each working day during the hours above stated, and all are required to give their entire time to the duties devolving upon them.

"OFFICE REGULATIONS.

"13. Loitering in the office and hallways of the office of the board of health during business hours is prohibited. Employees are particularly enjoined to give polite attention to all persons asking information or transacting any business with the board of health.

"14. The board of health for the Philippine Islands desires to impress upon its employees referred to that they should be mindful of the responsible duties devolving upon them, and the consequent necessity of deporting themselves in such a manner as will impress the general public, with whose interests they have such intimate relations, that they fully realize not only the dignity and responsibility of their official trusts, but also that their duty is to aid in maintaining discipline and efficiency throughout the various departments in carrying out the instructions of the board of health.

"EXPENDITURES.

"15. No expense shall be incurred by any officer or employee without written order of the commissioner of public health.

"16. Pay rolls of the officers and employees of the board of health shall be prepared monthly by the commissioner of public health and forwarded to the disbursing officer.

"AMENDMENTS, ETC.

"17. The commissioner of public health is empowered to make such other rules for the government of the office of the board of health as in his judgment will promote its welfare, and report the same at the next regular meeting of the board.

"18. These rules and regulations shall not be altered or amended, nor shall any new rules or regulations be made, unless pursuant to a notice of a motion therefor, or to alter or appeal, entered in the minutes at some prior regular meeting of the board of health for the Philippine Islands.

"19. The foregoing rules and regulations were accepted at a regular meeting of the board of health for the Philippine Islands, duly held on the 12th day of August, 1901, a quorum being present for the transaction of business, the same being approved by those entitled to participate in the meeting of this board."

Pursuant to the foregoing, the commissioner of public health, on October 21, 1901, appointed the following permanent and special committees:

PERMANENT COMMITTEES.

1. For the study and investigation of parasitical, contagious, infectious, and tropical diseases occurring in the Philippine Islands, including those of domestic animals; foods and beverages; the effects of employments, conditions, habits, and medicines on the health of the people, and the chemical composition and medicinal properties of mineromedicinal waters of the archipelago: Prof. Paul C. Freer, superintendent of government laboratories.

2. For the collection and publication of mortuary and vital statistics of the archipelago, including marriages, births, deaths, and their causes, together with the population of provinces, pueblos, and barrios within the archipelago; also for the publication of regular and special reports pertaining to the board of health: Dr. Manuel Gomez, secretary of the board.

3. For the drafting of sanitary laws and special health measures for the archipelago, including legislation for the regulation of the practice of medicine, dentistry, pharmacy, veterinary medicine, surgery and dentistry, midwifery, embalming, undertaking, public vaccinations, and for the segregation of lepers, consumptives, and of other contagious or infectious diseases requiring isolation: Maj. L. M. Maus, commissioner of public health.

4. On night soil, garbage, refuse, and their disposition; plumbing, cesspools, drains, insanitary esteros, dwellings and residences, and water supply: Capt. C. W. Mead, sanitary engineer.

5. On health ordinances, municipal sanitation and inspection, the control of dangerous and offensive trades and industries, and for the punishment of violations of sanitary laws: Maj. F. A. Meacham, chief health inspector.

SPECIAL COMMITTEES.

1. For the control and prevention of bubonic plague, smallpox, and other contagious and infectious diseases, including the construction and management of detention camp: Maj. L. M. Maus, chairmun; Maj. F. A. Meacham, Dr. Manuel Gomez.

2. For the drafting of municipal health regulations and ordinances for provincial pueblos and barrios: Dr. Justo Lukban, chairman; Maj. F. A. Meacham, Capt. J. C. Perry.

3. For the suppression and control of rinderpest and the locust plague: Col. B. F. Pope, chairman; Maj. L. M. Maus, Prof. Paul C. Freer.

4. On plans for, and management of, the pail system for the disposal of night soil in the city of Manila: Maj. F. A. Meacham, chairman; Prof. Paul C. Freer, Capt. C. W. Mead.

5. On river and harbor quarantine for Manila and other seaport towns in the archipelago: Capt. J. C Perry, chairman; Dr. Justo Lukban, Dr. José L. M. Guerrero.

6. On the construction, alteration, repair, and management of public dispensaries, hospitals for contagious and infectious diseases, asylums, laboratories for the production of vaccine virus, serums or prophylactics, disinfecting plants, morgues, etc., under the control of the board of health: Maj. L. M. Maus, chairman; Capt. C. W. Mead, Prof. Paul C. Freer.

7. On vices affecting the health of communities, their control, and suppression; Dr. José L. M. Guerrero, chairman; Dr. Manuel Gomez, Col. B. F. Pope.

8. On cemetries and the disposal of the dead: Dr. Manuel Gomez, chairman; Maj. F. A. Meacham, Dr. José L. N. Guerrero.

The board of health held regular meetings semimonthly and various special meetings during the year, at which drafts of the following proposed acts were presented and approved by the board and ordered to be forwarded to the Commission for legislative action:

1. Act regulating the practice of medicine and surgery in the Philippine Islands.
2. Act regulating the practice of pharmacy in the Philippine Islands.
3. Act regulating the practice of dentistry in the Philippine Islands.
4. Act regulating the practice of veterinary medicine, surgery, and dentistry in the Philippine Islands.
5. Act providing for the establishment of provincial boards of health, and fixing their powers and duties.

6. Act providing for the establishment of municipal boards of health, and fixing their powers and duties.

7. Act providing for the compulsory vaccination of the inhabitants of the Philippine Islands.

8. Act for the control and suppression of leprosy in the Philippine Islands.

9. Act regulating the manufacture, sale, and other disposition of beverages in the Philippine Islands.

10. Act transferring the employees of the board of health of the city of Manila under the provost-marshal-general to the board of health for the Philippine Islands.

Of the above, Nos. 1, 5, 6, 7, and 10 have been enacted and become laws (see Appendix A); Nos. 2, 3, 4, 8, and 9 have not yet been acted upon by the Commission.

The following resolutions were adopted by the board of health at the various meetings held from August 9, 1901, to July 31, 1902, and those requiring the action of the municipal board of the city of Manila, in order that they might be enforced, were forwarded to that body for enactment as city ordinances:

[Resolution of the board adopted August 22, 1901.]

Resolved, That it is for the best interests of the public safety that the pail conservancy system for the collection and disposal of night soil be inaugurated at once in the city of Manila in such places as necessity demands and the board of health may direct; that all open and foul vaults be closed as each closet is established; that the city install the system and pay the cost, making it a lien against the property, the owner of the property to collect the same from tenants and subtenants; that the cost of removing the excreta be borne by the person renting the property.

[Resolution of the board adopted September 6, 1901.]

Resolved, That no owner, agent, lessee, keeper, or tenant of any dwelling house, godown, bungalow, lodging house, boarding house, or manufactory shall allow the same to be overcrowded with occupants, or allow such a number of persons to dwell or sleep in any such house or any portion thereof, as may be dangerous or detrimental to life or public health.

To be kept posted in a conspicuous place:

"The greatest number permitted to lodge in this house is ——," 350 cubic feet of air space being allowed each occupant.

[Resolution of the board adopted October 25, 1901.]

Resolved, That the following draft of proposed ordinance for the regulation of tenement and lodging houses in the city of Manila be forwarded to the municipal board for enactment:

An Ordinance regulating tenement and lodging houses.

"SECTION 1. It shall be unlawful for any person to conduct a tenement or lodging house in the city of Manila without first obtaining a permit from the board of health as hereinafter provided for.

"SEC. 2. A tenement house within the meaning of this ordinance shall be held to indicate every house, building, or portion thereof which is rented, leased, let, or hired out to be occupied as the house, home, or residence of five (5) or more families, living independently of one another, and doing their cooking upon the premises, or by more than three (3) families on a floor, so living and cooking, but having a common right in the halls, stairways, yards, water-closets, or privies, or some of them.

"A lodging house within the meaning of this ordinance shall be held to include any house or building, or portion thereof, in which persons are regularly harbored, or received or lodged for a single night, or for less than one week at a time, or any part of which is let for any person to sleep in for any term less than one week.

"SEC. 3. A permit in writing from the board of health shall be required for all tenement and lodging houses in the city of Manila, which permit shall specify the number of persons permitted to lodge or dwell in said tenement or lodging house, and shall, moreover, always be displayed in a conspicuous position on said premises; and no person in said city shall have, lease, let, or keep such tenement or lodging house, or the apartments therein, except pursuant to the terms and conditions of said permit.

"SEC. 4. No owner, agent, or lessee of any tenement or lodging house, or part thereof, in the city of Manila, shall let, lease, rent, or hire the same, or any portion thereof, to be occupied by any person, or allow the same to be occupied as a place for anyone to dwell or lodge in, except when said tenement or lodging house, or parts thereof, are sufficiently lighted, ventilated, drained, provided with water-closets or privy accommodations, secured and protected against fire, and in all respects in a condition of cleanliness and wholesomeness; nor shall any such person let, lease, rent, or hire out, or allow, having the power to prevent the same, to be used as or for a place of sleeping or residence, any portion or apartment of any tenement or lodging house, which apartment or portion is not two feet from the level of every part of the sidewalk and curbstone of any adjacent street, nor of which the floor is damp, by reason of water from the ground, or which is impregnated or permeated by any offensive gas, smell, or exhalation prejudicial to health.

"SEC. 5. No owner, agent, or lessee of any tenement or lodging house in the city of Manila shall let, lease, rent, or hire out any room of said tenement or lodging house for the manufacture, preserving, or sale of food, or shall permit said manufacture, preserving, or sale; nor shall any owner, agent, or lessee of any tenement or lodging house permit a public laundry in said tenement or lodging house, or any portion thereof, nor shall any owner, agent, or lessee of any tenement or lodging house permit any portion of the same to be used as a stable.

"SEC. 6. No person in the city of Manila, having the right or power to prevent the same, shall knowingly cause or permit any person to sleep in any cellar, or in any bathroom, or in any room where there is a water-closet, or in any place dangerous or detrimental to life or health by reason of a want of ventilation or drainage, or by reason of the presence of any poisonous, noxious, or offensive substance, or otherwise.

"SEC. 7. No owner, agent, or lessee of any tenement or lodging house in the city of Manila shall cause or allow the same to be so crowded, or cause or allow so great a number of persons to dwell, be, or sleep in any such house, or any portion thereof, as thereby to cause any danger or detriment to life or health.

"SEC. 8. No owner, agent, or lessee of any tenement or lodging house in the city of Manila shall permit any water-closet, vault, privy, cesspool, or other deposit for foul or noxious matter to ventilate into any dwelling room, kitchen, or other place in said tenement or lodging house where any people lodge or dwell or where cooking is done."

[Resolutions of the board adopted October 26, 1901.]

Resolved, That the board of health direct the sanitary engineer to draw up plans and specifications for 20 barracks, 1 superintendent's house, 10 separate dwellings, and 1 guardhouse, together with plans and specifications for all water supply, draining, latrines, pail system for night soil, and all other necessary details to allow the board of health to advertise for bids for a detention camp and to let a contract for the same.

Resolved, That the superintendent of the San Lazaro Hospital be authorized to have material purchased for the manufacture of clothes for the leper inmates, and to have same made up, or to have contract made for furnishing clothes sufficient for the present needs of the inmates, and also to keep a small stock on hand.

Resolved, That the sanitary engineer be authorized to draw up plans and specifications for additional hospital accommodations of a temporary character at the San Lazaro Hospital, women's department, in view of its overcrowded condition at present.

[Resolutions of the board adopted October 29, 1901.]

Resolved, That the sum of $335, or as much as necessary, be expended from the money appropriated for miscellaneons expenses, suppression of plague, in the antitoxine experimental station, in order to complete the work of isolating the plague-culture laboratory.

Resolved, That the plans and specifications for the construction of the plague pavilion, in place of the present tent hospital, as submitted by the special committee on plague, be adopted, and that the same be advertised immediately, and contract awarded to lowest bidder, reserving the right to reject any or all bids.

[Resolutions of the board adopted October 30, 1901.]

Resolved, That the commissioner of public health be authorized to advertise for bids in three papers in Manila—one American, one Spanish, and one Tagalog—for the construction of 20 large buildings, 1 superintendent's house, and 10 small buildings, with the necessary water-closet and bathroom outbuildings, per plans as submitted by the city engineer, three of which large buildings and small houses to be constructed at once, the remaining large buildings and small houses to be constructed at such time as the board of health may direct.

Further resolved, That the city engineer submit plans and specifications for the same immediately.

[Resolutions of the board adopted November 1, 1901.]

Resolved, That the following draft of proposed ordinance, designating what shall be termed nuisances injurious to health, be forwarded to the municipal board for enactment:

"An Ordinance to designate what shall be termed nuisances injurious to health in the city of Manila.

"1. Filth: The contents of water-closets, vaults, privies, dry-earth closets, cesspools, offal, garbage, foul water, dye water, refuse from manufactories, ordure, urine, stable manure, carrion, decayed animal or vegetable matter, or other substances detrimental to health, dropped, thrown, placed, or allowed to remain in or upon any street, avenue, alley, sidewalk, gutter, public reservation, open lot, the bank of any estero, stream, river, or other waterway, or permitted or suffered to remain in any drain, sewer, or elsewhere opposite to or within the neighborhood of any dwelling house, or accumulation of any filthy or offensive substance within any premises to the annoyance of the inhabitants or passengers in the city of Manila, are hereby declared nuisances injurious to public health.

"2. Carrying or transporting of bones, hides, fish, garbage, offal, or other animal or vegetable substance in decomposing or offensive condition in any other than covered and inclosed vehicles, through any street, avenue, alley, or public place, or in any casco, banca, barge, or other boat, not covered or inclosed, through any estero, stream, river, or other waterway within the city of Manila, is hereby declared a nuisance injurious to health.

"3. Manure accumulated in great quantities; manure, ordure, or garbage piled or deposited within 300 feet of any place of worship, of any dwelling, or unloaded along the line of any railroad, estero, stream, river, or other waterway, or in any street or public way; cars, flats, or cascoes, bancas, barges, or other boats loaded with manure or other offensive material remaining or stopping along the line of any railroad, street, or highway, or in any stream, estero, river, or other waterway in the city of Manila, is hereby declared a nuisance injurious to health.

"4. Filling, leveling, or raising of the surface of any ground or lot within the city of Manila with animal or vegetable substances, filth gathered in cleaning yards or streets, or waste material from mills or factories, or the removal of the surface of any ground or lot within said city filled with such offensive matter or substance in such a manner as to cause noisome odors or noxious gases to arise, without proper permits from the board of health, is hereby declared a nuisance injurious to health.

"5. Open lots or fields, unprotected by fences, in the city of Manila, into and upon which passengers can throw or dispose filth, are hereby declared nuisances injurious to health.

"6. Any house, building, or land, whether tenantable or otherwise, allowed to be in a filthy or unwholesome state, or overgrown with rank or noisome vegetation, is hereby declared a nuisance injurious to health.

"7. Throwing or placing any defiling or poisonous substance, decayed animal or vegetable matter, or filth into, or causing or allowing the same to pass or enter into, any spring, well, or river water used by the public for drinking or cooking purposes, or into the water of any public reservoir or water pipe supplying said city, whereby such water is rendered impure and unwholsome, is hereby declared a nuisance injurious to health.

"8. The construction or the erection of any shed, house, or other structure on any public or private land within the drainage area of any public reservoir or inlet for any water pipe supplying the city of Manila with water is hereby declared a nuisance injurious to health.

"9. Any deposit of stagnant water or any noxious matter in any public street, road, gutter, or side channel of any street or road, or wherever situated in the city of Manila, is hereby declared a nuisance injurious to health.

"10. Swamps and low fields in the city of Manila, which are covered with stagnant water at all times, or at any other time than that of floods, are hereby declared nuisances injurious to health: *Provided*, That nothing in this section shall apply to rice and zacate paddies and other grounds under continuous cultivation.

"11. Keeping, or allowing to be kept, in the city of Manila, for more than twenty-four hours, otherwise than in some proper receptacle, so as not to constitute a menace to the life or health of any human being, any dirt, dung, bones, ashes, night soil, filth, or other noxious or offensive material in any premises or houses, or suffering such receptacle to be in a filthy or noxious state, or neglecting to employ proper means to remove the filth therefrom, and to clense and purify the same, is hereby declared a nuisance injurious to health.

"12. Drain pipes, soil pipes, passages into sewers and cesspools, or connections between any sewer and cesspool, and any ground or building not of adequate or sufficient size to allow the free and entire passage of all material that enters the same, or not provided with good and sufficient sewer traps, so as to prevent the escape of noisome odors and noxious gases therefrom, are hereby declared nuisances injurious to health.

"13. All water-closets, privies, and vaults connected with any house, building, or premises within the city of Manila in or upon which people live, or where they congregate or assemble, or where any kind of business is done, which are kept in a filthy or offensive condition, or from which noisome odors and noxious gases arise, and all water-closets located within and being a part of such building or house, not provided with proper sewer traps so as to prevent the return and escape of noxious gases or offensive odors from any public or private sewer connected therewith, are hereby declared nuisances and a menace to health.

"14. Any building, or part of building, or land in the city of Manila not sufficiently provided with water-closets, privies, sinks, vaults, or dry-earth closets, as determined by the board of health of said city, is hereby declared a nuisance injurious to health.

"15. Fecal matter, not thoroughly deodorized and disinfected, remaining in privies, vaults, or sinks, in the city of Manila is hereby declared a nuisance injurious to health.

"16. The system of transporting night soil, the contents of water-closets, privies, privy boxes, vaults, sinks, cesspools, and dry-earth closets within the limits of the city of Manila, by open barrels or other containers not air tight, through the streets, avenues, public places, esteros, streams, rivers, or other waterways within said city is hereby declared a nuisance injurious to health.

"17. Any huts or sheds, whether used as dwellings or as stables, or for any other purposes, which are, by reason of the manner in which said huts or sheds are crowded together, or by the want of drainage and impracticability of scavenging, dangerous to the life or health of any human being, are hereby declared nuisances injurious to health.

"18. Any factory or workshop which (1) is not kept in a cleanly state and free from offensive smells arising from any drain, water-closet, privy, sink, dry-earth closet, urinal, or other place for the depositing or collecting of night soil, urine, or other offensive or noxious substances; (2) is so overcrowded while work is carried on as to be injurious or dangerous to those employed therein, is hereby declared a nuisance injurious to health.

"19. Any cemetery or place of burial within the city of Manila, so situated or conducted as to be a menace to the life or health of any human being, is hereby declared a nuisance injurious to health.

"20. Filthy and unwholesome stables, sheds, pens, yards, or other places where carabaos, cows, horses, mules, or other animals are kept, within the city of Manila, are hereby declared nuisances injurious to health.

"21. Any animal affected with glanders or other contagious or pestilential disease, kept or remaining in any stable, shed, pen, or other place, within the city of Manila, is hereby declared a nuisance injurious to health: *Provided*, Nothing in this section shall be held to prevent the keeping or holding of such animal suffering from glanders, or other contagious or pestilential disease, in a properly constructed, isolated stable, conducted under the supervision of the board of health of said city.

"22. Obeying the calls of nature, or permitting any child under 12 years of age in care or custody, to obey the calls of nature on any way, or in any public park, street, alley, doorway, or other places not a public or private urinal, water-closet, cesspool, sink, dry-earth closet, or privy, is hereby declared a nuisance injurious to health.

"23. Undressed dead animals being or lying in any part of the city of Manila, viz, any horse, mule, carabao, cow, goat, sheep, dog, swine, or any other animal, is hereby declared to be a nuisance and injurious to health."

Resolved, That the commissioner of public health communicate with the Secretary of the Interior in regard to the immediate examination of the island of Cagayan de Jolo concerning its water supply and suitability as a leprosy colony, and also for making arrangements to remove the inhabitants to some other island.

[Resolution of the board adopted November 5, 1901.]

Resolved, That every prostitute in the city of Manila shall be required to submit to a weekly examination, and oftener when deemed necessary, by a medical inspector of the board of health, and when found suffering from a contagious venereal disease shall be sent to the women's department of San Lazaro Hospital for treatment, and shall remain there until pronounced free from contagion by the hospital physician: *Provided*, That in place of being sent to San Lazaro Hospital for such treatment, any prostitute found suffering from a contagious venereal disease may, at her own discretion, secure private treatment from a registered physician in some other hospital or residence apart from her place of vocation and satisfactory to the board of health, and remain during such treatment under the observation of, and subject to the orders of, the medical inspector of the board of health.

"Hereafter no prostitute shall be sent to the women's department of San Lazaro Hospital or required to secure private treatment for a gonorrheal infection until a microscopical examination and the presence of gonococci established."

[Resolution of the board adopted November 6, 1901.]

Resolved, That a copy of Ordinance No. 1, as promulgated by General Orders No. 16, headquarters provost-marshal-general, Manila, P. I., dated April 6, as amended, be immediately transmitted to the municipal board for enactment as a city ordinance, and to provide penalty for violation of the same.

[Resolutions of the board adopted November 8, 1901.]

Resolved, That the sum of $135 in the currency of the United States be appropriated from the funds set aside for rinderpest, plague, and catching of rats, for the purpose of constructing a shed in which to arrange the work of preparing rat poison.

Resolved, That a copy of Ordinances Nos. 2 and 3, promulgated in General Orders, No. 20, headquarters provost-marshal-general, Manila, dated May 2, 1901, and Ordinance No. 14, promulgated in General Orders, No. 38, same authority, dated July 15, 1901, in English and Spanish, be immediately forwarded to the municipal board, amended by the board of health November 8, for enactment as city ordinances, and penalty provided for violation of same.

[Resolutions of the board adopted November 16, 1901.]

Whereas it is believed by the board of health that every nipa house within the plague zone of the city of Manila, defined by the provost-marshal-general as the strong-material district, which has not been provided with a proper cement, tile, or stone floor, or floor of other hard material, and which is located less than 3 meters from any neighboring house, is a menace to the public health: Be it

Resolved, That the owner of such houses shall be required to provide a proper tile, cement, or stone floor, or floor of other hard material, to the satisfaction of the board of health, or place a wooden or bamboo floor within said building 4 feet or more above the ground, and to leave the space beneath it clean and open; and also, be it

Resolved, That the city engineer be authorized to have all nipa buildings in the above-mentioned district so arranged that a space of 3 meters or more shall be left between each building and neighboring house or houses: Be it further

Resolved, That a copy of this resolution be immediately forwarded to the municipal board for enforcement as an ordinance, and to provide penalties for its enforcement.

[Resolutions of the board adopted November 18, 1901.]

Resolved, That it is necessary for the public health that all vaults or deposits, insanitary cesspools, insanitary sewers, foul and filthy water or earth closets in the city of Manila be closed or repaired to the satisfaction of the board of health, and the pail conservancy system be installed as soon as possible in all places where such vaults, insanitary cesspools, sewers, etc., have been closed or where it is otherwise necessary;

And it is recommended to the municipal board that the city pay for the cost of installing the entire plant and that the property owners or their agents be required to reimburse the city for the cost of the pails, commodes, and other appliances on their respective property as well as for the cost of removal of the night soil to the wharf from their houses or premises; the cost of the pails, commodes, and other appliances on the property, together with the cost of removal of the night soil, to be made a lien against the property until paid for, the cost of all other property and material necessary for the operation of the system and the removal of the night soil from the wharf to the sea to be borne by the city: Be it further

Resolved, That a copy of this resolution with recommendation covering the cost of the installation of the pail system be immediately forwarded to the municipal board for enactment as a city ordinance, and authorizing the board of health to prescribe such rules and regulations, approved by the municipal board, as may be necessary for carrying the same into effect, fixing penalties for its violation, and placing the actual work under the direct management of the board of health.

[Resolution of the board adopted November 22, 1901.]

Resolved, That the San Sebastian estero in its present condition is a menace to the public health and should either be filled or completed at once, and it is recommended that this resolution be forwarded to the municipal council.

[Resolutions of the board adopted November 26, 1901.]

Whereas the trade of barbering, when carried on without proper antiseptic precautions, may result in the spread of certain infectious and parasitical diseases, such as sycosis, ringworm, favus, impetigo contagiosa, acne, lupus, pustular diseases, gonorrheal ophthalnia, syphilis, and hence become a menace to the public health: Be it

Resolved, That after the enactment of this ordinance no person will be licensed to carry on the business of barbering or hair dressing in the city of Manila who has not passed an examination in antiseptic barbering or hair dressing before a board of one or more examiners convened by the commissioner of public health. All persons passing such required examination shall be furnished with a certificate of qualification by the commissioner of public health. The fee of this examination shall be $1, United States currency.

Hereafter, all persons engaged in the trade of barbering or hair dressing in the city of Manila shall comply with the following rules, which must be posted in a conspicuous place in their respective places of business.

First. While actively engaged in the various operations of their trade all barbers shall wear a clean coat or shirt made of white wash material, with short sleeves, over which shall be worn clean oversleeves of the same material, and shall, before operating on any person, thoroughly scrub and wash the hands, keeping the finger nails cut short and well trimmed.

Second. Every person engaged in the trade of barbering shall thoroughly cleanse and disinfect each razor, comb, pair of scissors, or clippers before use. A fresh and clean towel, or towels, shall likewise be furnished each customer.

Third. All persons engaged in the trade of barbering in the city of Manila shall make ample provisions in their respective places of business for boiling and keeping on hand hot water and a sufficient number of clean towels for the use of their customers.

Fourth. Public shaving cups and brushes must be thoroughly washed with hot water each time before use. Powder must be applied by means of a clean towel, the use of the puff ball being prohibited.

Fifth. The same piece of alum, camphor, etc., employed for arresting bleeding, shall not be used a second time.

Sixth. Ample provision shall be made in each barber shop for the boiling and keeping on hand of hot water.

The use of public hair brushes is discouraged by the board of health, although not prohibited, as they are a medium of conveying parasitical and fungus diseases. Be it further

Resolved, That a copy of this resolution be forwarded to the municipal board of enactment.

Whereas the common practice by the Chinese and others of cleaning the ears and scraping the eyelids with instruments which have not been made aseptic after use in each instance is conducive to the spread of fungus and parasitical diseases and a menace to public health, such practice is hereby declared a public nuisance: Therefore, be it

Resolved, That the municipal board of the city of Manila be requested to prohibit the continuance of this practice, and that a copy of this resolution be forwarded to municipal board for action and to provide penalties for its violation.

Resolved, That the occupants of houses on Carvajal street, which houses have previously been announced as a menace to the public health, be required to vacate their premises at the earliest possible moment compatible with law in order that these houses may be placed in a proper sanitary condition. Be it further

Resolved, That a copy of this declaration be sent to the municipal board for action and enforcement.

Resolved, That ordinance No. 6, relating to diseased animals, as promulgated in G. O. No. 23, headquarters provost-marshal-general, Manila, P. I., dated June 7, 1901, be forwarded to the municipal board for enactment as a city ordinance, as amended in section 2 by striking out the words "physician or surgeon" and "and every person owning or having animals in his care," and in section 6 by striking out the words "approved by the provost-marshal-general" and substituting the words "rules and regulations" for the word "instructions," and to provide penalty for the violation of the same.

This ordinance will be found in Exhibit C.

[Resolutions of the board adopted December 3, 1901.]

Whereas the following houses in which cases of plague have been found or in which rats affected with plague have been caught are foci of bubonic plague and capable of spreading this disease in the community, and are therefore a menace to the public health, they are hereby declared nuisances: Be it therefore

Resolved, That the owners or agents of said houses or premises are hereby directed to abate such nuisances, under the supervision and direction of the board of health, by removing all wooden floors in the basements, cellars, or storerooms, and substituting therefor concrete or other hard material, such as stone, tile, brick, etc.; to remove partitions and other parts of the structure which may be recommended by the board of health; and to remodel and place these buildings in a sanitary condition satisfactory to the board of health and as nearly rat proof as possible; to apply paint or whitewash wherever directed; and that said houses in which cases of plague have been found or rats affected with this disease shall be immediately vacated within fifteen days of the time of serving legal notice to vacate said premises, and remain vacated until the board of health issues a certificate certifying that said buildings have been repaired according to the directions of the board and are safe for reoccupancy. Be it further

Resolved, That if, after a thorough examination, it has been found that any building declared a nuisance within the meaning of this resolution, on account of plague, can not be repaired and placed in a satisfactory sanitary condition, and at the same time fit for human habitation or for purposes of legitimate business, that such building be torn down. Be it further

Resolved, That in the event that the owners, agents, or occupants, or any of them, are unable financially to make these repairs, or refuse to do so, the work shall be done by the city of Manila, and the city attorney directed to institute proceedings against such delinquent property owners or agents to recover the amount expended by the city. Be it further

Resolved, That a copy of this resolution be immediately submitted to the municipal board of the city of Manila, recommending that an ordinance be enacted providing for its enforcement.

Whereas all of the ruins of buildings, churches, warehouses, etc., in the city of Manila are rendezvous for rodents infected with bubonic plague, places for the collection of filth and dirt, and sites for the habitation of people of the poorest classes, which result in the spread and propagation of tuberculosis, catarrhal and other diseases, are a menace to the public health, and are hereby declared a nuisance: Therefore, be it

Resolved, That the municipal board be requested to cause all such ruins in the city of Manila to be pulled down and removed at once, the débris hauled away, and the grounds occupied by such ruins to be cleaned and opened to sunlight; and be it further

Resolved, That in case the owners or agents refuse to perform this work or are unable to do so, that it be done at the cost of the municipality, and that the prosecuting attorney for the city be authorized to institute proceedings against the owners or agents of the lots for the recovery of the money thus expended. Be it further

Resolved, That a copy of this resolution be forwarded to the municipal board for action and enforcement.

Whereas the houses and premises No. 311 Calle Jolo (owner, Mr. Tuason) and Nos. 84–92 Calle Ylaya (owner, Mr. D. Gutierrez), on account of their extremely unsanitary condition, are unfit for human habitation and declared a menace to the public health and a nuisance to the city of Manila: Be it

Resolved, That the owners or agents be required to place these buildings and premises in a proper sanitary condition to the satisfaction of the board of health, and that the houses be closed to occupancy until these alterations, repairs, and changes have been made. Be it further

Resolved, That a copy of this resolution be forwarded to the municipal board of the city of Manila for action and enforcement.

[Resolutions of the board adopted December 7, 1901.]

Resolved, That the resolution made on November 5 permitting women of the town who are suffering from venereal disease to be treated in private hospitals or by private physicians be withdrawn, and that they all be required to be sent to the San Lazaro Hospital until they are free from such contagious or infectious diseases.

Resolved, That the commissioner of public health is authorized to receive at once bids for the manufacture of pails, commodes, and middens for the installation of the pail system.

Resolved, That the collector of customs for the Philippine Archipelago be requested to interdict trade of these commodities between these islands and Manila or between each other for the present and until otherwise instructed by the board of health, and also request that no carabao or cattle that are suffering from rinderpest, or that are taken from here affected with this disease, be permitted to be shipped from these islands.

Resolved, That the resolution made on November 5 permitting any woman living in illicit cohabitation or prostitutes who are suffering from venereal diseases to be treated in private hospitals or by private physicians be withdrawn, and that all be required to be sent to the San Lazaro Hospital until they are free from such contagious or infectious diseases.

Whereas unscrupulous persons engaged in the business of procuring young women for purposes of prostitution are enticing girls of 12, 13, or 14 years of age; and

Whereas such a practice is a menace to the public health: Be it

Resolved, That the proprietor of any house of prostitution in the city of Manila shall not, under any circumstances, take into said house for the purpose of prostitution any girl under 15 years of age. Be it further

Resolved, That every prostitute desiring to relinquish her vocation shall be placed under rigorous observation for a period of six months, and if during such time she lives a worthy life, her name shall be dropped from the roll of prostitutes. Those relapsing who have once relinquished the vocation will be obliged to suffer a longer observation, as the board of health may direct, should they again desire to give it up. Be it further

Resolved, That a copy of this resolution be forwarded to the municipal board and to the chief of police.

[Resolutions of the board adopted December 24, 1901.]

Whereas it has been found necessary, for the purposes of public health and for the proper disposition of unknown and pauper dead, to establish a morgue in the city of Manila: Therefore, be it

Resolved, That the sanitary engineer of the board of health be directed to submit plans and specifications for the same at the earliest possible date.

Whereas the board of health of Manila is greatly hampered in its work of rendering sanitary crowded, congested, and plague-infected districts of Manila by reason of the fact that no suitable houses in which to place the poor and laboring classes are available: Be it

Resolved, That the government architect and the sanitary engineer of the board of health be requested to draw up plans and specifications for suitable tenement houses to be constructed in or near the city of Manila, and that a committee of three of the board of health, of which the commissioner shall be one, be appointed to decide upon a suitable location for such tenement houses and report to the board.

[Resolution of the board adopted December 30, 1901.]

Resolved, That a copy of ordinance No. 8, promulgated in General Orders, No. 25, headquarters provost-marshal-general, Manila, dated June 12, 1901, as amended by the board of health, be immediately forwarded to the municipal board for enactment as a city ordinance.

This ordinance will be found in Appendix C.

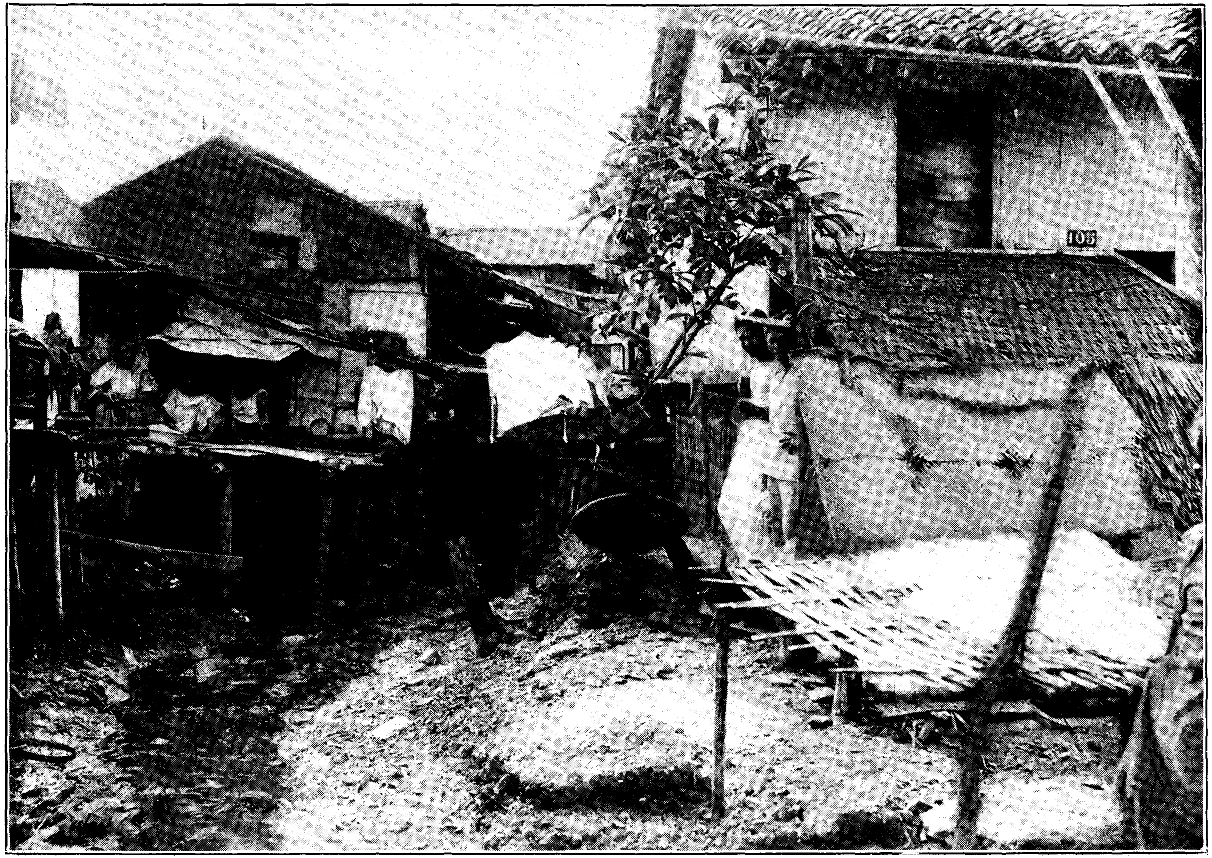
[Resolutions of the board adopted January 21, 1902.]

Pursuant to the resolution of January 17, be it

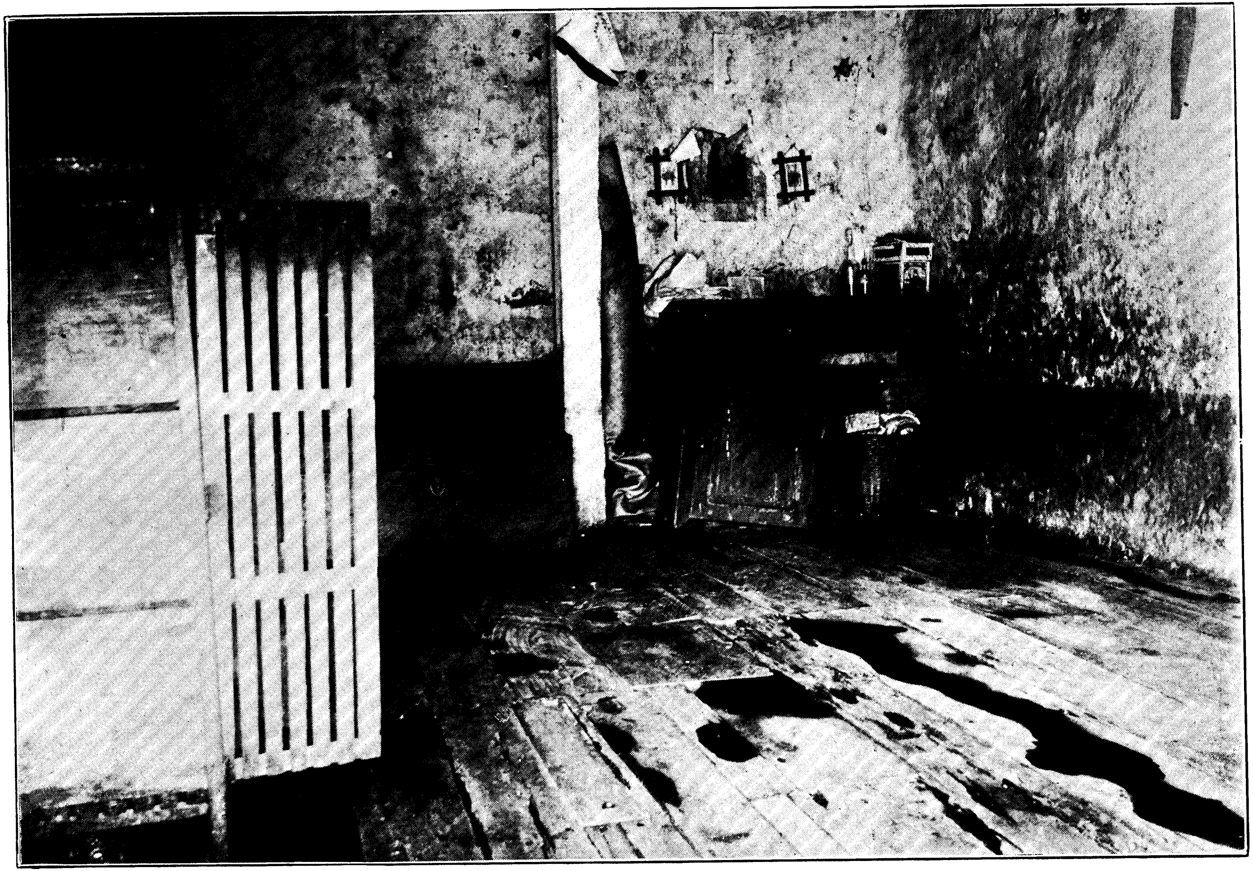
Resolved, That the plans and specifications for conservancy pails, as modified from the original design, be approved and the same be advertised for bids in Manila, or any other locality or localities approved by the Secretary of the Interior. Be it further

Resolved, That each competitive bidder submit a sample of the pail which he proposes to make previous to the acceptance of any bid, and if such pail be found, in the judgment of the board of health, to be superior in design, material, and price to any produced in exact accordance with the specifications, the board of health shall be at liberty to accept a bid on such sample pail, which shall then take the place of said plans and specifications. Be it further

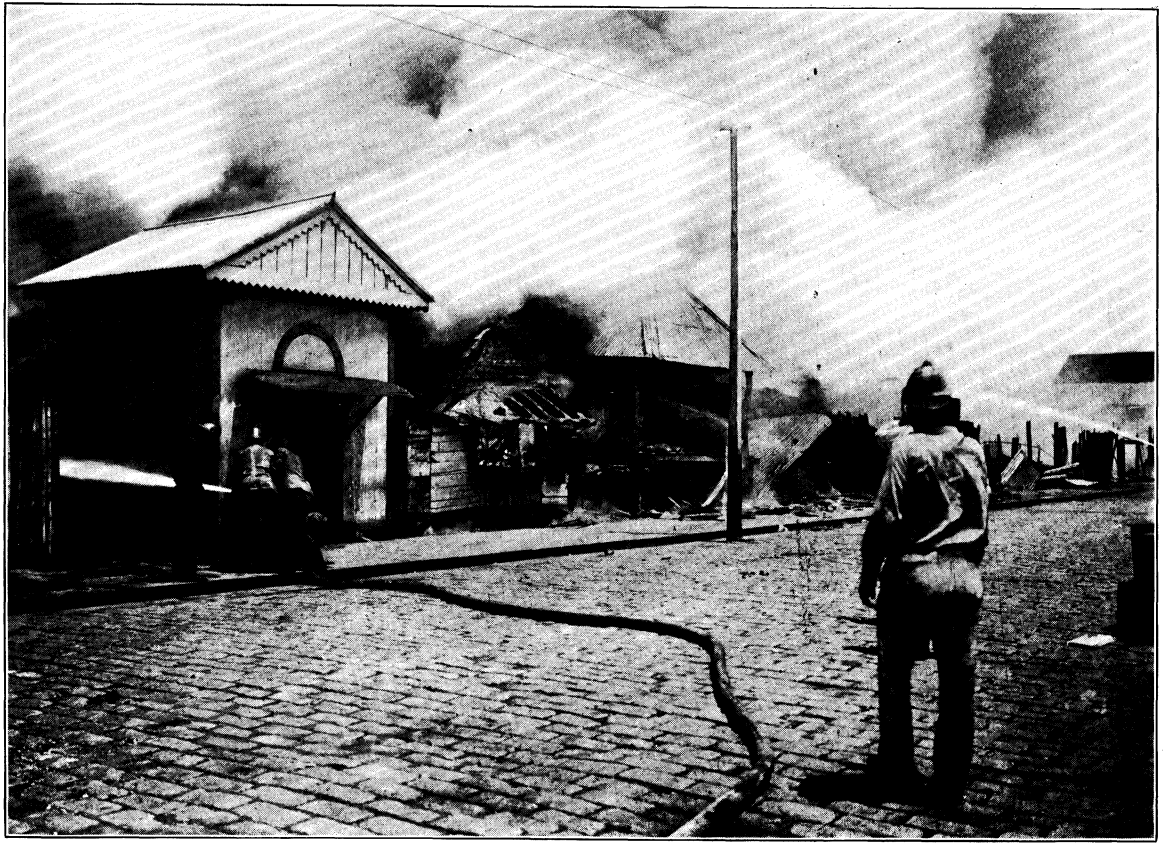
Resolved, That the representative of the board of health for the Philippine Islands advertise for bids on the said pails on the same day on which the said advertisement appears in Manila; that he obtain samples of the pails submitted for acceptance and bring the same to Manila; all bids to be simultaneously opened in Manila. Be it further



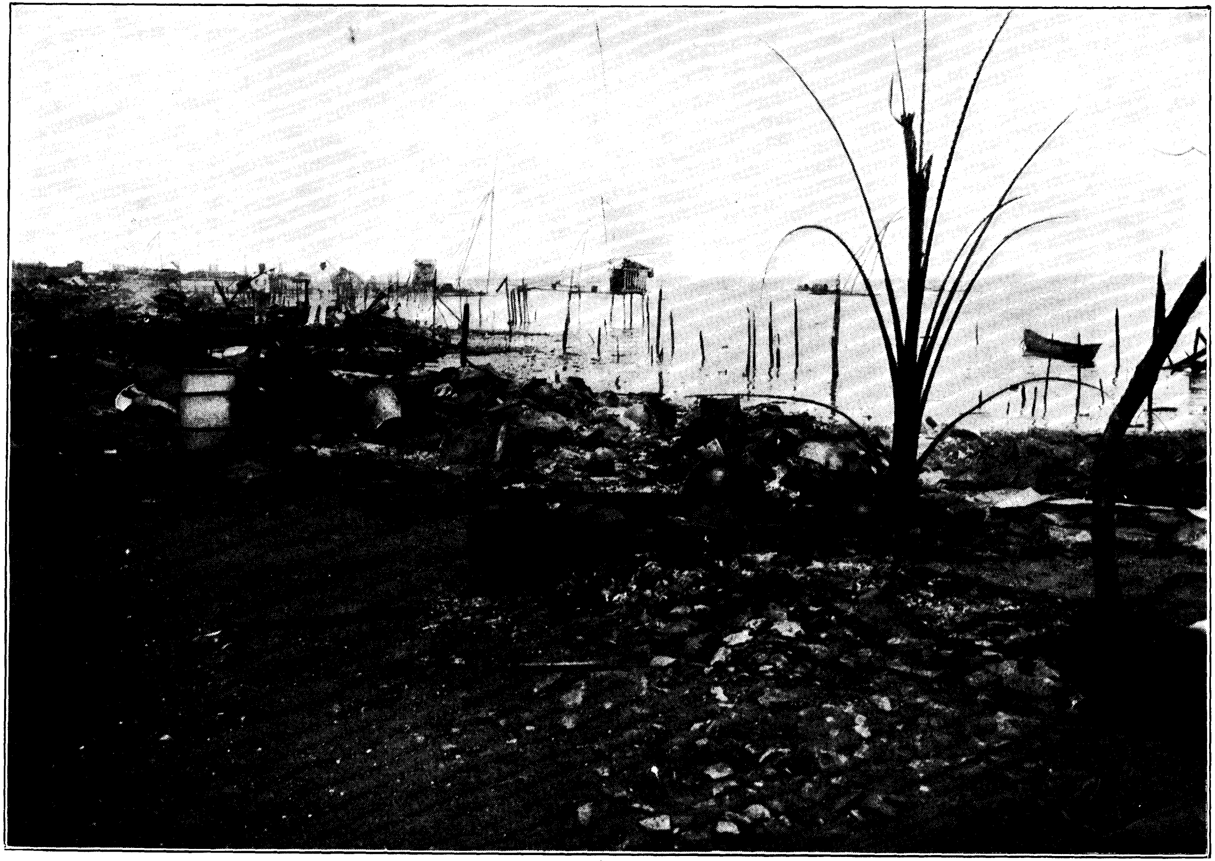
TYPICAL CHOLERA HOUSE, OVER FILTHY OPEN DRAIN.



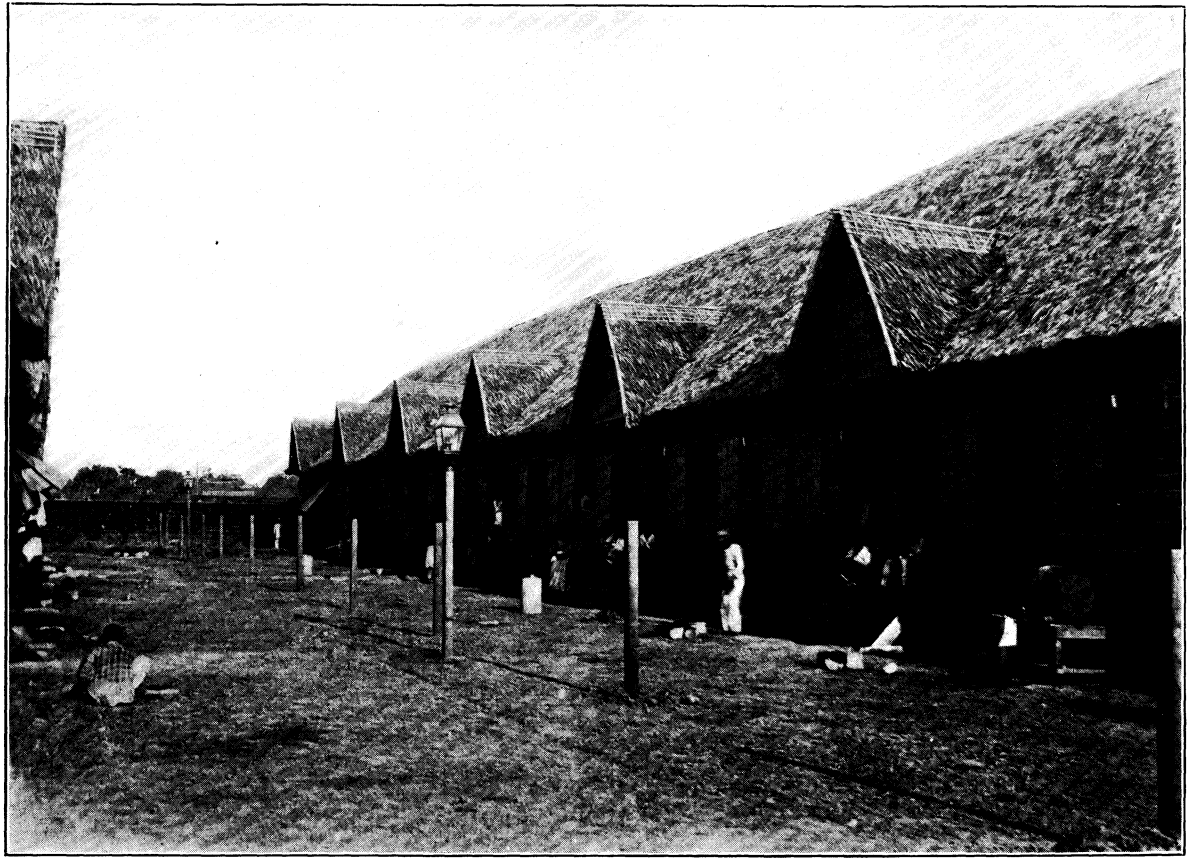
A TYPICAL PLAGUE INTERIOR.



DESTRUCTION OF THE FAROLA DISTRICT.



FAROLA DISTRICT AFTER BURNING OF INFECTED BUILDINGS.



BARRACK IN CHOLERA DETENTION CAMP AT SAN LAZARO—FRONT VIEW.

Resolved, That the period of time which must elapse between the advertisement for bids and the opening of the same may be extended by the board of health for the Philippine Islands at its discretion. Be it further

Resolved, That all bids be opened by the commissioner of public health, who shall then submit the details to the committee on plans and management of the pail system for the disposition of night soil, city of Manila, who shall examine the same and report to the board of health for the Philippine Islands for final action. Be it further

Resolved, That a copy of this resolution, also copy of the resolution of January 17, be immediately transmitted to the honorable the Secretary of the Interior.

[Resolution of the board adopted January 28, 1902.]

Resolved, That the report of the committee on plan and management of the pail system for the disposal of night soil, city of Manila, submitting specifications for wooden buckets to be used in the pail system, be approved and adopted.

This report contains the following specifications for the construction of the pails, which are adopted:

"*Specifications for the wooden buckets to be used in the pail system of sanitation.*

"This contract is for the furnishing of all the materials and the construction complete of 12,000 pine buckets of the following dimensions: Diameter of bucket inside at top, 15 inches; diameter of bucket inside at bottom, 13 inches; depth of bucket inside, 17 inches; capacity of bucket, 1.5 cubic feet.

"No dimensions on the drawings are to be scaled. Only dimensions given in figures are to be used.

"1. All lumber shall be of the best quality, well seasoned, free from checks, cracks, splits, or knots, and shall be sound throughout.

"2. All ironwork shall be true to dimensions, and the joints shall work freely.

"3. All workmanship shall be of the best, and shall confirm strictly to the dimensions.

"4. The hoops shall each be made of one piece of galvanized iron, 1½ inches wide by one-sixteenth of an inch thick. There shall be four to each bucket. Each hoop shall have a lap of 4 inches, and be fastened with 2 rivets.

"5. The cover shall be made of two thicknesses of three-fourths-inch plank with the grains run at right angles to each other. The top layer shall be 16¼ inches in diameter and the bottom layer shall be 14⅞ inches in diameter. The slotted one-fourth-inch wrought-iron strip shall be countersunk to flush surface with the top. The screws holding this to the cover shall be countersunk into the iron. Surrounding the lower layer and attached to the upper layer shall be a rubber gasket one-fourth of an inch thick and five-eighths of an inch wide. Each layer of this cover shall be made of one piece of board or of two pieces tongued and grooved to fit. The top layer shall be fastened to the bottom layer by 12 1⅜ inches long galvanized screws placed on the circumference of a 13-inch diameter circle. Previous to fastening with the screws the two layers shall be glued together with a suitable waterproof glue.

"6. The staves shall be five-eighths of an inch thick and shall be fitted to the right dimensions before the bucket is finally set up.

"7. The bottom shall be 1 inch thick.

"8. When completed, and with the cover screwed on, each bucket shall be absolutely water-tight before painting.

"9. The entire interior of the bucket, including the cover, shall be thoroughly coated with pitch paint.

"10. The work shall at all times be under the supervision of an inspector, whose decisions shall be final.

"11. The buckets shall be furnished on the dates and in the quantities herewith given, viz, 500 buckets on March 22, 1902; 500 buckets on April 15, 1902; 2,000 buckets on May 15, 1902; 2,000 buckets on June 6, 1902; 7,000 buckets on July 15, 1902."

[Resolutions of the board adopted February 11, 1902.]

Resolved, That the disbursing officer of the board be directed to purchase at once 7 suitable American horses and 10 Australian or native cows for inoculation with plague serum and rinderpest serum, respectively, from the moneys appropriated for the eradication of rinderpest and plague. Be it further

Resolved, That the commissioner of public health be directed to request authorization for the employment of one director of the institute for the preparation of prophylactic serums and vaccines, at a salary of $1,800 per year, for the present, and one assistant, at $1,200 per year, for the present.

Whereas typhoid fever, dysentery, and other diseases are water borne; and

Whereas the waters of the moat and various esteros of the city are contaminated with the germs of these diseases,

Resolved, That the sprinkling of streets with water taken from such sources is a menace to the public health and a nuisance and should be prohibited in future by the city authorities. Be it further

Resolved, That a copy of this resolution be forwarded to the municipal board for enactment as an ordinance.

Whereas rats and other rodents affected with bubonic plague are potent factors in the spread and dissemination of that disease,

Resolved, That the board of health cause traps and ratbane to be placed by sanitary inspectors and official rat catchers on the premises and in various private and public buildings of the city until bubonic plague becomes eradicated from the city; and further

Resolved, That a copy of this resolution be forwarded to the municipal board for enactment as an ordinance.

Whereas parks and recreation grounds are necessary in large cities for the health and contentment of the inhabitants, and in order to prevent overcrowding and atmospheric vitiation,

Resolved, That the tract of land extending from the Luneta on the east and running along the walled city to the Pasig River on the north, thence to the Government ice plant, and from thence along the front of the Estado Mayor to military hospital No. 1; from thence east on Calle Conception to the intersection of Calle San Marcelino with Calle Conception, and from thence to the sea,is a suitable tract to be forever reserved for park purposes for the use of the people of Manila, and that such action on the part of the municipal board would be an important factor in the improvement of the general health of the city; and be it further

Resolved, That a copy of this resolution be forwarded to the municipal board for consideration.

[Resolutions of the board adopted March 21, 1902.]

Whereas green vegetables and fruits are potent factors in the spread of Asiatic cholera and should be prohibited from the public during the existence of that disease in the city, they are hereby declared a menace to the public health and a nuisance.

Resolved, That all vegetables and fruits in the city of Manila be destroyed at once, under the direction of the board of health, but appraised before destruction, and that the inspection and sale of all foods be placed under the board of health as long as the epidemic exists in the city. Be it further

Resolved, That a copy of this resolution be sent to the municipal board for enforcement.

Whereas the city of Manila is threatened with Asiatic cholera and in all probability, by reason of six cases resembling cholera which have already occurred, the disease has already entered the city; and

Whereas cholera is a water-borne disease,

Resolved, That all the wells in the city of Manila and the tanks and cisterns are a menace to the public health, and are hereby declared a nuisance and should be closed from further use, under the direction of the board of health, until the complete disappearance of the disease. Be it further

Resolved, That this resolution be sent to the municipal board for action and enforcement.

[Resolutions of the board adopted March 23, 1902.]

Resolved, That a committee of two be appointed by the commissioner of public health to take charge of the free water distribution of the city of Manila during the cholera season.

Resolved, That the committee in charge of the distribution of water to the citizens of Manila during the cholera season be authorized to employ any number of laborers or other employees they may require, hire transportation, and to purchase the necessary barrels, casks, or other articles necessary for the distribution of water without referring the matter to the board of health.

Resolved, That a committee of two be appointed to take charge of the inspection of foods in the city of Manila, and the destruction of fruits and vegetables that may be necessary, and that the commissioner of public health be authorized to appoint such committee.

Resolved, That said committee on inspection of foods in the city of Manila be authorized to appraise and destroy any vegetables, foods, or fruits in the city, at once, which they deem necessary, without referring the matter to the board of health, and have authority to employ any inspectors or other employees, or transportation that may be necessary to carry out this work, and to pay all necessary expenditures, taking the necessary receipts therefor.

[Resolutions of the board adopted March 24, 1902.]

Whereas cholera is a water-borne disease, and unboiled water is a menace to the public health, and is hereby declared a nuisance,

Resolved, That the proprietors of hotels, boarding houses, saloons, restaurants, cafes, and other places where foods and drinks are sold to the public be prohibited from giving or selling any drinks containing water that has not been boiled, except well-known mineral waters. Further

Resolved, That a copy of this resolution be forwarded to the municipal board for enforcement.

Whereas cholera has been conveyed by raw fruits and vegetables used as food, be it

Resolved, That the following fruits and vegetables, and all other fruits and vegetables that are used raw, are a menace to the public health, and are hereby declared a nuisance: Pineapples, chicos, watermelons, muskmelons, apples, radishes, lettuce, cabbages, celery, eggplants, tomatoes, peppers, cucumbers, green onions, turnips, water cresses, and sugar cane; and be it further

Resolved, That the sale of such vegetables shall be prohibited within the city of Manila during the present epidemic of cholera, and all at present found on sale within said city shall be appraised and destroyed, and all brought into the city after March 26, 1902, shall be destroyed without appraisement.

At this meeting the following circular letter was approved for publication:

"Owing to the danger of an outbreak of cholera in the city of Manila, the following rules are to be observed by all inhabitants. Householders are warned to communicate these rules to all their servants at once, and parents or guardians are charged to see that they are observed by children or wards under their charge. School-teachers are directed to communicate these rules to all pupils under their care.

"1. All drinking water, water used for cleaning teeth, washing the face and hands, cooking, and washing dishes, should be either distilled or boiled. This is imperative, because cholera is a water-borne disease. Any well-known bottled mineral water may be used for drinking purposes.

"2. All milk, if diluted, shall be diluted with boiled water.

"3. Avoid eating all uncooked vegetables and fruits.

"4. All meats should be thoroughly cooked, so as to be heated throughout.

"5. All persons are especially charged to report any suspicious case of sickness, with colicky pains in the bowels, to a physician at once, both for their own protection and that of the community.

"6. Disinfect all closets and vaults thoroughly with a mixture of lime and chloride of lime, or crude carbolic acid."

[Resolution of the board adopted March 26, 1902.]

Whereas the district known as the Farola Barrio, of the city of Manila, is at present time infected with Asiatic cholera, and a center of infection for the disease, and it is therefore a menace to the public health, and is hereby declared a public nuisance, be it

Resolved, That the houses and property in this barrio be appraised by a committee appointed by the commissioner of public health, and that such houses and property be destroyed at the discretion of the committee so appointed.

[Resolution of the board adopted March 31, 1902.]

Whereas in order to prevent the contamination of the water supply of the city of Manila with cholera germs it is necessary to maintain a strict quarantine on the city of Manila, and to guard carefully the Mariquina Valley, be it

Resolved, That the plans and suggestions submitted for the accomplishment of the above purposes, and as given below, be adopted by the board of health:

Outline of inspection for the Mariquina Valley.

One medical officer in charge of the valley, to be stationed at San Mateo, with the following under him: One inspector at pumping station, with charge of ferry and with a guard day and night of 3 constabulary; 1 medical inspector at Mariquina, with

3 subinspectors, who shall inspect all houses, looking for cases of diarrhea, from the pumping station to a point halfway between Mariquina and San Mateo; 1 medical inspector, with 3 subinspectors at San Mateo, who shall inspect the territory from that point halfway between San Mateo and Mariquina to a point 2 kilometers above San Mateo; 1 medical inspector, with 2 subinspectors, at Montalbon, who shall take charge of the territory beginning 2 kilometers above San Mateo and extending to the source of water supply.

It shall be the duty of these inspectors to make a house-to-house inspection, with special reference to all intestinal diseases, such as diarrhea, colic, etc., and to immediately disinfect same and see that all orders of the military are rigidly complied with, and that no matter whatsoever shall get into the Mariquina River, so far as this lies within their power.

[Resolution of the board adopted April 7, 1902.]

Whereas, owing to the continual recurrence of Asiatic cholera on the shipping of the Pasig River, and the impossibility of the board of health making thorough inspection while such shipping is anchored there, it is a menace to public health and hereby declared a nuisance; be it

Resolved, That all lorchas, lighters, cascos, and other small craft be compelled to leave the river at night, not later than 5 p. m. daily, and be not allowed to return before inspection by a duly authorized sanitary officer; be it further

Resolved, That all bancas, launches, ferries, and small steam craft, at present quarantined in the Pasig River, be compelled to remove out to such anchorage as shall be designated by the captain of the port and there remain until released from quarantine; be it further

Resolved, That no bancas, lorchas, etc., be allowed to enter or leave the Pasig River after 5 p. m.; be it further

Resolved, That all sailing craft, not discharging cargo, be compelled to leave the river after discharging said cargo, and anchor at a spot designated by the captain of the port.

[Resolution of the board adopted April 12, 1902.]

Whereas all houses constructed of light materials, by reason of their construction, can not be properly disinfected when infected with cholera, they are hereby declared a menace to the public health and a nuisance;

Resolved, That such structures shall be entirely or partially destroyed, at the discretion of the board of health, but, before such destruction, shall be appraised by the board of health; further

Resolved, That a copy of this resolution be forwarded to the municipal board for enactment as an ordinance.

[Resolution of the board adopted April 14, 1902.]

Whereas Asiatic cholera is epidemic in Manila, and nearly all the cases of that disease are concealed from the board of health; and

Whereas, in order to eradicate the disease from the city it is necessary that all cases be reported to the board of health, in order that radical measures may be taken for stamping out the infection;

Resolved, That all heads of families, captains, owners, or other persons in charge of vessels, cascos, barges, lighters, launches, or other shipping; principals of colleges, schools, etc.; persons in charge of convents, nunneries, asylums; proprietors of hotels, boarding houses, lodging houses, restaurants, cafés or other places where such disease appears, be required to give notice to the board of health or its agents by means of telephone or a messenger, immediately, whenever during the existence of cholera in Manila any person is taken suddenly ill with any acute disease; further

Resolved, That a copy of this resolution be forwarded to the municipal board for enactment as an ordinance, with a penalty affixed for its violation.

[Resolution of the board adopted April 30, 1902.]

Whereas, the land lying between the Calles San Marcelino de Camillas and Concepcion, now occupied by a number of nipa shacks, is humid and unfit for human habitation, it is hereby declared a menace to the public health and a nuisance;

Resolved, That persons occupying this land be required to move, and that the land be left vacant until placed in a sanitary condition; further

Resolved, That a copy of this resolution be forwarded to the municipal board of the city of Manila for enforcement.

[Resolution of the board adopted June 10, 1902.]

Whereas death has taken from our midst our colleague, Dr. Franklin A. Meacham, chief inspector of the board of health for the Philippine Islands, who was always helpful in advice and counsel, performing his duties with untiring energy, matured judgment, and unfailing devotion to the highest ideals, sacrificing health and life in a strenuous effort to prevent the calamity of a great epidemic; be it

Resolved, That in his death the board of health has suffered a most serious misfortune, and the individual members have lost a comrade whom each cherished with an affection which can never fade, a man true to his profession, true to his high mission of protecting the life and health of the community, true to his friends; be it further

Resolved, That the heartfelt sympathy of the board of health be extended to the family of the deceased in its great bereavement, and that this resolution be entered upon the minutes of the board of health of the Philippine Islands and a copy thereof be sent to the mother of the deceased.

[Resolution of the board adopted June 17, 1902.]

Whereas the mortality of the city of Manila is abnormally high, apart from the extra deaths caused from cholera; and

Whereas it is believed that a large number of the inhabitants die from cholera and are not reported to the board of health by the attending physicians; and

Whereas every house in which a case of cholera occurs which has not been disinfected becomes a central point of infection for the spread of the disease, be it

Resolved, That no certificate of death shall be given for the interment of any body in the city of Manila during the existence of cholera until the cause of death has been ascertained by a member of the board of health, or one of its agents; be it further

Resolved, That any physician in the city of Manila, head of a family, or other responsible person who has charge of a case of infectious disease without reporting the same to the board of health in accordance with city ordinance No. 4, enacted December 16, 1901, and regulation No. 2 of the board of health, issued April 10, 1902, shall be prosecuted; be it further

Resolved, That every case of cholera taken to the cholera hospital may be treated at the hospital by the family physician, if the family so desire; provided, however, that the physician complies with the rules and regulations of the board of health while at the hospital.

Whereas the posts on the Laguna de Bay are infected with cholera, and there is no proper surveillance on the passenger traffic between points in that section and Pasig; and

Whereas cases of cholera are being brought into the towns along the Pasig River and into the city of Manila, be it

Resolved, That all passenger traffic between Pasig and Taguig and points on the Laguna de Bay be suspended for the present.

In order to more effectually secure the cooperation of the natives in reporting cases of cholera, be it

Resolved, That 1 peso shall be given to any citizen of the city of Manila, not employed by the board of health, for reporting a case to the medical inspector of the district.

[Resolutions of the board adopted June 23, 1902.]

Whereas mangoes are believed to be a potent factor in the spread of cholera in the city of Manila: Therefore, be it

Resolved, That the sale of mangoes be prohibited after Tuesday night, June 24, 1902.

Whereas the provinces of Cavite, Batangas, Tayabas, and Laguna are infected with cholera: Therefore, be it

Resolved, That all passenger traffic from ports in these provinces to Manila be prohibited until further notice, excepting for such passengers as have a certificate from the medical officer of the port from which they sail that they have been held in detention for five days previous to embarkation. These certificates must be presented in Manila. Crews of such vessels must not communicate with the shore. It shall be the duty of the municipal health officer to see that this order is enforced. Any steamer carrying passengers without such certificates, or whose crews shall have communicated with the shore, will be subject to five days' quarantine in Manila; be it further

Resolved, That all banca and passenger traffic between pueblos on the Bay of Manila, in the province of Cavite and Manila, be absolutely prohibited until further orders; be it

Resolved, That these resolutions go into effect at noon June 25, 1902.

[Resolution of the board adopted July 1, 1902.]

Whereas it is known to the board of health that the detentions of contacts has been ineffective in Manila, owing to the impossibility of securing contacts: Therefore, be it

Resolved, That the quarantine of contacts be abandoned, and that hereafter all the inmates of a house in which a case of cholera occurs be required to submit to a thorough disinfection of their persons and of the premises.

Whereas owing to the religious prejudices of the people against the cremation of their dead and to the occulation of cases which occur as a result of their procedure: Be it

Resolved, That from this date the friends or family of the persons dying from cholera in the city of Manila are authorized to bury their dead in wooden coffins, provided they are placed in graves 7 feet deep and in lime, the interments be made under the supervision of the board of health or one of its agents.

[Resolutions of the board adopted July 8, 1902.]

Whereas it is believed that the waters in the esteros, Pasig River, and on the shores contiguous to Manila are infected with the cholera bacillus,

Resolved, That the collection of oysters, bivalves, snails, and other mollusks in these waters, and their sale in the markets and tiendas of Manila, be prohibited during the existence of cholera.

[Resolutions of the board of health adopted July 18, 1902.]

Whereas infection by cholera has spread to many of the provinces of the Philippine Islands, and a rigid land quarantine between such provinces is no longer necessary.

Resolved, That no land quarantine be maintained between infected provinces.

Provincial boards of health in noninfected provinces may, if they deem it necessary, establish land quarantines against infected provinces and pueblos, provided always, that such land quarantines be removed as soon as the noninfected provinces become infected.

Further resolved, That traffic on the railroad be opened, without passes, from Manila to Dagupan and return.

And further resolved, That nothing in this resolution shall apply to the Mariquina Valley.

Whereas misintrepretation of the existing quarantine rules by provincial quarantine officers has led to a loss in the shipping interests.

Resolved, That from this date on all vessels clearing from any infected port to any other infected port will not be subject to quarantine.

All vessels clearing from quarantine in clean ports will not be subject to further quarantine, unless sickness appears on board, or unless they touch at an infected port en route.

Vessels from infected ports arriving at noninfected ports can receive and discharge cargoes in quarantine, under the direction of local quarantine officers. Green vegetables, excepting potatoes and onions, are not to be allowed.

[Resolution of the board of health adopted July 22, 1902.]

Whereas the committee in charge of the destruction of the Farola district, after consultation with the board of health and the honorable secretary of the interior, and in order to prevent further spread of cholera, destroyed such district after making a gross valuation of the property, and not a minute valuation.

Therefore, be it resolved, That the commissioner of public health appoint a committee with power to fix the valuation for purposes of reimbursement by the board of health of the property so destroyed in the Farola District, and the value, for the same purpose, of all other property which may be destroyed by order of the board of health during the continuation of the present epidemic of cholera, within the following restrictions, to wit:

Any reimbursement for houses shall be based upon the valuation placed thereon by the city assessor and collector; remuneration for personal property shall be based on a valuation placed thereon by the committee.

The actual owners of property so destroyed, provided they have been and are in needy circumstances, shall be reimbursed for such property after such valuation, if such owners present satisfactory proof of actual ownership.

Claims of persons not in needy circumstances shall be valued as above and referred to the board of health for adjustment, although when such claim is manifestly just the committee will be allowed to use its discretion.

Payments for houses assessed in gold shall be made in local currency at the government rate of exchange at the time of burning.

[Resolutions of the board of health, adopted July 29, 1902.]

In case of death from cholera the body may be disposed of by the family or friends of the deceased, provided the following rules are complied with:

1. The body will be placed in a suitable casket, packed in quicklime and taken direct to any cemetery approved by the board of health, and buried not less than 6 feet deep, or as deep as the condition of the ground will admit, but not less than 3 feet in any case.
2. The body may be accompanied by two adult members or friends of the family. No services, funeral procession, or band will be allowed.
3. The funeral will be under the direction of a designated employee of the board of health, who will have authority to enforce compliance with these regulations.
4. Undertakers are directed to acquaint themselves with these regulations, and infractors will be subject to penalty under ordinance No. 30, municipal board of Manila, sections 2 and 3.
5. In case there are no relatives or others who desire to bury the body under the above conditions, the body will be sent to the morgue for suitable disposal.

Be it resolved, That the board of health take charge of the Tondo cholera hospital from the 1st of August, 1902, assuming all expenses from that date.

Be it further resolved, That the commissioner of public health be authorized to appoint a committee to investigate the running expenses and accounts of said hospital from the 21st of July to the 1st of August, and make recommendations to the board of health as to the payment of the accounts for that period.

[Resolutions of the board of health, July 30, 1902.]

Whereas cholera germs may be transmitted by infected clothing,

Be it resolved, That during the present epidemic of cholera no child shall be allowed to attend private or public school from a house in which cholera exists, nor until five days shall have elapsed after the removal or recovery of the patient.

Whereas the ground included in the Tondo Cemetery is now filled with cadavers, and is unsuitable for the interment of cholera cases by reason of the proximity of the water to the surface, and

Whereas the further burial of bodies in this cemetery is hereby declared a nuisance and a menace to the public health, therefore,

Be it resolved, That no more cholera cases be allowed to be interred in the Tondo Cemetery.

Be it further resolved, That a copy of this resolution be sent to the municipal board for enactment as an ordinance.

Whereas the reports of Drs. Dudley and Angeles were presented to the board of health, in which it was stated that no more cholera is present in Pasig, San Mateo, Mariquina, and Montalban, and the commanding officer of the town of Mariquina has recommended that the natives be authorized to transfer their produce to Manila through Pasig, for sale, in view of the proposed modifications of the existing restrictions and of the disturbed condition of the people because of the military quarantine within the Mariquina Valley, it is recommended by the board of health that the army continue the cordon on the Mariquina River and at Mariquina but that the board of health for the Philippine Islands take charge of health matters in the Mariquina Valley; that Capt. F. M. Dudley, Assistant Surgeon, U. S. V., medical inspector of the board of health, act for the board of health in that valley, assisted by Dr. Sixto Angeles, president of the provincial board of health for Rizal.

Sanitary Condition of Manila.

SITE OF THE CITY.

When Legaspi sailed into the bay of Manila in 1564 he found a small pueblo on each side of the Pasig River, located on the sites known at present as Intramuros and Murallon, the latter being a portion of the Binondo district.

The town on the south side of the river was known then as Maynilat, which means a place abounding in "nilat," a native shrub, and was occupied by a tribe of the Malayan race known as the Tagaliac, or shore dwellers. The town on the north side was called Bondoc, a Tagalog word signifying mountain or high place.

The two sites referred to above were much higher than the surrounding valley or plain, which extends back to the foothills of Santa Mesa and La Loma. All that section of Manila which now includes the districts of Trozo, Santa Cruz, Quiapo, Sampaloc, and San Miguel on the north of the river, and Paco, Ermita, Malate, Pandacan, and Santa Ana on the other side, was very low, swampy, and filled with bayous and esteros.

At the date of Legaspi's arrival these two towns were surrounded by a stockade consisting of "palma brava" and earth, and it is more than probable that the sites themselves had been raised by filling in with earth or by the accumulation of filth. The mouth of the river and the surrounding shores were densely screened by mangrove trees, and the land extending farther back was to a certain extent filled in with mangrove swamps, so commonly found at the present time on the shores of certain islands in the southern part of the archipelago.

As the city spread the grounds to the north, east, and south became more or less filled in by the natural accumulation of domiciliary filth, or by sand taken from the Pasig River. At the present date the mangrove swamps and many of the bayous have disappeared, and it is more than probable that the entire valley in which Manila is located has already been raised, since the Spanish conquest, from 5 to 10 feet. Notwithstanding this substantial improvement, it will be necessary still to raise a large portion of the city site from 3 to 4 feet before it can be regarded as suitable for habitations and sufficiently elevated above the surface water, which can be reached almost anywhere by digging down from 1 to 3 feet.

The Spanish conquerors selected as a site for their town the high ground on the south side of the river, and immediately began the construction of the present walled city. At first they built houses of nipa and bamboo, but very soon commenced the erection of stone buildings. The native stockade around Maynilat was strengthened by placing a double row of posts, the space between which was filled in with earth, thus forming a wall. This stockade was supplanted by the present magnificent stone wall and moat which surround the city, the construction of which was begun about 1690.

The moat surrounding the walled city is not altogether artificial, for at the time of the Spanish invasion Maynilat was surrounded by a wide natural estero or bayou, which was used at that time for commercial purposes. In a plan of the city dated 1710 this estero is shown containing a number of small islands, canoes, and sailing vessels.

In 1600 stone buildings began to take the place of nipa houses. They were constructed on the lines of Spanish architecture, with balconies, or "volantes," on the second story. Owing to the many violent earthquakes these buildings were thrown down from time to time, and a large number of lives lost, especially during the terrible earthquake which occurred in 1863. From this date the Government prohibited the use of stone as a building material for second stories, and of tile for roofing.

CHARACTER OF BUILDINGS.

The buildings in Manila are constructed of sandstone or an imitation called Roman cement, of wood, and of nipa. The older parts of the city, which are densely crowded as a rule, are constructed of stone, stuccoed, with upper stories of frame. The buildings in the residential part of the city, occupied by the better class of Filipinos, Americans, Spaniards, and foreigners, are all frame with galvanized-iron roofs, usually two stories high, while in the outlying districts the houses are built of light material (cane and nipa) and are one story high.

The foundations of the stone and frame buildings in the city of Manila are unscientific, and, as a rule, insanitary. Without any special preparation of the ground these foundations of sandstone or Roman cement are placed upon the same and the walls built up without cement protection. As a result of this method of faulty construction the majority of the lower stories in the stone houses are water soaked from six to eight feet above the ground, varying in distance according to the dryness of the site.

It is estimated that the city of Manila contains at present about 20,000 residences, 10,000 of which are of nipa, these being distributed throughout the various outlying districts. A large proportion of the buildings in the district of Tondo, Binondo, Santa Cruz, Sampaloc, Paco, Ermita, and Malate are of this material.

Besides the nipa houses which are built on the open lots about the city a large number are distributed in the courts or back yards of the stone dwellings, which are often crowded with nipa houses or with shacks constructed of bits of sheet iron, platted bamboo, tin cans, etc., with only enough room between them for communication with the street.

The surface occupied by the nipa houses is, as a rule, unprovided with proper drainage, as a result of which during heavy rains the accumulation of filth and garbage is floated out into the streets and deposited over the district, thus spreading the germs of disease far and wide.

From reports received of 2,000 nipa houses recently inspected only 11 were provided with cans for the collection of garbage, and but 5 were provided with water-closet arrangements. As each of these so-called dwellings affords shelter for from 8 to 12 persons, it is impossible that sanitary regulations can be successfully enforced at present. The occupants of these shacks, as a rule, are of the lowest and most ignorant classes, and there is no doubt but that the city would be greatly benefited by their removal.

WATER SUPPLY.

Manila derived its water supply from four different sources: First, the Mariquina River; second, wells; third, cisterns; fourth, the Pasig River.

The main supply of the city is obtained from the Mariquina River, a stream rising in the mountains above Montalban. This river has several tributaries, all of which rise in the neighboring mountains. Before reaching the pumping station at Santolan the river flows through a thickly-populated valley containing the towns of San Mateo, Montalban, and Mariquina, the combined population of which is estimated at 13,000. The people living along the stream above the pumping station use the river water freely for domestic purposes. They not only bathe in the river themselves, but allow their domestic animals to do so. During the rainy season the filth along the entire valley, and from these towns especially, is washed into the river, so that it can readily be seen that the water supply of our city from these sources is more or less contaminated and not fit for drinking purposes until it is either boiled or filtered.

The flow from the Mariquina River during the dry season amounts to about 36,000,000 gallons per day, 6,500,000 of which are daily consumed by the city. The pumping station contains four old pumps, which have been worked to their full capacity for a number of years, and are capable of forcing into the deposito about 10,000,000 gallons per day. Before distribution to the city the water is forced into two subterranean reservoirs hewn out of a soft, white rock, which are known as the deposito. One of these reservoirs has a capacity of 6,300,000 gallons and the other 8,200,000. The combined storage amounts to a two days' supply for the city. In order to keep up a strong pressure these reservoirs are kept full, but at the best only forty pounds per square inch can be secured in the district of Sampaloc, which is nearest to the deposito, this pressure lessening to almost nothing in the more distant sections of the city. This lack of pressure is in part due to the small size of the distributing mains.

Dr. Calvert, of the army, who was connected with the board of health when it was under the control of the provost-marshal-general of the city of Manila, made a number of bacteriological examinations of water taken from the river above and below Mariquina and other towns in the valley, and found as many as 613,703 bacteria to the cubic centimeter when the water was filled with people bathing, and with animals, while during a quiescent state he found from 6,000 to 15,000 colonies to the cubic centimeter. This is in striking contrast to the water supply of Boston, which contains about 73 bacteria to the cubic centimeter, and the Croton water supply of New York, with from 50 to 75.

The number of connections to the public water supply is far below that of an American city of the same size. During the past year there were but 1,825 private subscribers to the water, whereas an American city of the same size would have from 30,000 to 50,000. The total connections of the city, including hydrants, fire plugs, launch plugs, and fountains, amount to 3,329. During the last year the cost to the city of a cubic centimeter of water was 0.0059, and the expenses of the department $54,710.86.

The present water supply is insufficient, badly contaminated, and a constant menace to the public health. Therefore, additional pumps should be secured as soon as possible, and a system installed for the purification of the water. A new and larger water supply system is now under consideration, and it is intended to increase the delivery to the city by more than one-half.

The only perfect sanitary measure for public water purification is the intermittent filtration system. With good filtration beds, the purification of 250,000 gallons to the acre can be obtained in ordinary cases. Allowing at the rate of 100 gallons per capita per day, a filtration area of 100 acres is needed for the city at present, and a pumping station with a capacity of 25,000,000 gallons per day, allowance being made for an extra engine and boiler in case repairs be necessary to one of the other engines. A reserve reservoir should also be added to the system, and an additional conduit with distributing mains.

Wells.—It is difficult to submit a close estimate of the number of wells in the city, as there is no complete record to be found, although the number of wells in proportion to the number of houses is much greater in the walled city than in any other district. As a rule these wells are walled up with cut stone, the work being done in an excellent manner. A few of them are kept clean, but the majority are dirty, and the water is usually polluted. These wells are generally located in the backyards, in the vicinity of the stable and cess-pool, and not infrequently receive a great deal of the drainage. The system of wells should be abolished as soon as possible, as the water obtained from them is very largely used for drinking purposes without further preparation; but until the introduction of a larger water supply this will be practically out of the question.

Cisterns.—Cisterns are quite common in the walled city, and are to be found in many of the older and better class of houses in other parts of the city. Cisterns are for the most part made of sheet iron, and situated above the surface; others are built in the ground, and made of stone and cement.

DISPOSAL OF NIGHT SOIL.

The following systems are in use in this city for the collection and disposal of night soil:

1. Traps connected with private sewers emptying into the river, esteros, and bay. Many of these traps are obsolete and insanitary.
2. Traps connected with cesspools (posos negros). The same remark as made above applies to these traps.
3. Open vaults constructed of solid masonry known as "depositos."
4. Earth closets.
5. Barrel and bucket system.
6. Pits with superstructures.
7. Superstructures without pits; the deposits in this case being dropped on the surface and removed by hogs or desiccation.
8. Removal by means of night vessels, the contents being thrown around the premises.

Until quite recently some of the best houses in Manila were provided with a seat on the second story, on the outside of the house, and the deposit allowed to drop in the yard below, where it was finally scraped up and carried away. The cesspools are at present emptied by the odorless excavators, and their contents dumped at sea. The depositos or stone vaults so commonly found in Manila, as well as in all Spanish cities, are relics of the middle and barbarous ages, and in many of them the undisturbed collections of fecal matter of years were found to exist at the time of the American occupation. A large number of these depositos are now kept clean by the board of health, while others have been closed on account of their insanitary condition. As may be noticed on casual inspection, the stone walls of these vaults are permeated with fecal matter, and as a result a permanent odor of night soil can be detected in many of the finest residences in the city. As soon as the board of health installs the pail system these depositos will all be closed, but until the prospective sewer system becomes a reality it will be impossible to place Manila in a proper sanitary condition and remove the many pernicious systems which are now in use.

SEWERS, DRAINS, AND GUTTERS.

The sewer system of the city of Manila was evidently designed with the idea of making use of the tides for the purpose of flushing and carrying off sewage. During the early days of American occupancy the city records were carelessly guarded, and hence the engineering plans of the Spanish Government remaining are quite fragmentary. It is quite impossible, therefore, to give the extent or the details of the sewer system now in use. The systems in the walled city and in the populous districts of Binondo, San Nicolas, and Santa Cruz appear to be the most complete. It is more than probable that in laying out the permanent modern system now under consideration sewers will be found that have long been lost sight of.

The main sewers consist of stone masonry with flat bottoms, vertical sides, and arched tops, and are intended to run out clean at low tide. As they are quite wide, with flat bottoms, the area over which the sewerage spreads reduces the velocity of the flow, which loses greatly in scouring action. The old idea was, the larger the sewer the better, while, on the contrary, the smaller the sewer possible for the work the better the scouring action, and hence the invention of the egg-shaped sewer which has been adopted by sanitary engineers at the present time.

The subsurface drains consist of narrow, stone gutters built immediately at the edge of the pavement, with a covering of ordinary stone loosely put together. The street drains already provided in certain sections of the city are constructed of masonry, and are deep, narrow, and uncovered.

In many sections of the city no attempt whatever has been made to put in artificial drains or gutters. Owing to the flatness of the city site, the disposal of surface water is a difficult proposition, and during the rainy season in many sections of the city the sides of the streets become pools of stagnant water, partly owing to the rains and partly to the drainage from stables and back yards. It is more than probable that when the sewer system is installed pumping stations will have to be provided in the city for the disposal of surface drainage.

DISPOSITION OF GARBAGE.

The garbage of the city is collected in garbage cans which are placed in front of the house, and their contents removed daily by the city carts. The garbage is then loaded on a barge and taken out to sea and dumped. This method of disposal of garbage, owing to the character of the population, is not carried out strictly, especially in the nipa districts. It is almost impossible to carry out a perfect system for the disposal of garbage in sections where for large areas the houses are crowded together, and where there are practically no streets, as is the case in the nipa districts.

ESTEROS.

There are over thirty esteros or branches of esteros within the city limits, and although they are dirty, foul, and ill-smelling, their value to the city as commercial waterways, sewers, open drains, and irrigating ditches is almost incalculable. Very few of them are properly walled or cleaned out. The sewers from a large number of the private houses empty into these esteros, and the night soil from all the adjoining nipa shacks is dumped into them. A thorough survey of the esteros of the city should be made and the lines of those retained corrected and their sides properly walled. They should also be thoroughly dredged out and cleaned, their contents being used to fill in low places about the city. The flushing of the esteros, which is now done by the tide, could be greatly accelerated by constructing above the Malacañan a canal which could be connected with the estero system and dammed up by means of a gate. At low tide this water could be allowed to sweep through the system and in this manner scour it out.

CEMETERIES.

In Manila there are the following cemeteries: Loma (government), Paco (government), Santa Cruz, Balic Balic, Binondo, Tondo, Maytubig, Malate, Pandacan, Santa Ana, San Pedro Mecati, American National, and Chinese.

Interments are made either in the ground or in niches. For the former graves are usually dug about 7 feet long, 2½ feet wide, and 5 feet deep for adults, the dimensions being smaller in proportion for children. Those who die of infectious diseases, such as bubonic plague, smallpox, or cholera, when not cremated, are buried in quicklime 7 feet deep. Ordinary graves are filled in with earth and left with a mound about a foot and a half high. Sometimes they are covered with a kind of mortar made of lime and sand. The distance left between graves is 1 meter.

Before the arrival of the Americans, and some months after the occupation of the city of Manila, burials without coffins were permitted, but since the organization of the board of health for the Philippine Islands such burials have been forbidden. Owing to the great cost of niches, they are only used by the wealthier classes. Formerly the bodies interred in the earth or in niches remained undisturbed for five years, when, if the same were not rerented by the members of the family, the bones were collected and buried in a common pit or placed in a small walled inclosure intended for their reception.

The government charges $34.65 Mexican for a niche for an adult in the Paco Cemetery, and $16.80 for a niche for a child. This sum pays the rent for five years. When the family or relatives of those who die of infectious diseases, such as cholera, bubonic plague, etc., are unable to meet the expenses incurred in complying with the ordinance of the municipal board governing the burial of such remains—i. e., that the body be placed in a hermatically sealed metallic coffin—the corpse is conveyed to the crematory without expense to the relatives or friends.

The following rules and regulations were adopted by the board of health for the government of public cemeteries:

RULES AND REGULATIONS FOR THE GOVERNMENT OF CEMETERIES.

"1. Curates and superintendents of burial grounds are prohibited from allowing any dead body or part of a dead body to be disinterred, removed from, or interred in their respective grounds between sunset and sunrise.

"2. All disinterments shall be made in the presence of a representative of the board of health.

"3. The burial of a dead body or part of a dead body of any human being at a less distance than 6 feet is a nuisance, prejudicial to the public health, and is prohibited, except when placed in authorized niches, which, when filled, must be hermatically sealed.

"4. All receiving vaults shall be kept clean and disinfected.

"5. No interment of the dead body of any human being, or disposition thereof in any grave or temporary vault, shall be made unless said body is placed in a metallic box or a box so constructed as to prevent the issuance of any liquids therefrom.

"6. The curates or superintendents of cemeteries shall render weekly returns of the nnmber of interments in the respective grounds on forms prescribed by the board of health."

POPULATION OF MANILA.

In the year 1900 the board of health attempted to secure a census of the city of Manila through the agency of the native sanitary inspectors. These agents were provided with the usual census blanks, and after several months of labor succeeded in securing an approximate estimate of the population.

The figures obtained in this manner, 250,000, were accepted by the city authorities and have since been used in computing the birth and death rate of the city.

Believing these figures to fall short of the actual population of the city, the board of health again took the matter up, and from the results of a more careful examination finds the population to number approximately 302,154 souls. These figures are based on the actual number of cedulas sold during the year 1901, as obtained from the office of the city assessor and collector.

Cedulas sold in 1901.

To Filipinos	38,070
To Chinese	25,685
To foreigners	1,785
To Americans	1,071
Total	66,617

In the opinion of the city assessor and collector, 15 per cent of the Filipinos, 5 per cent of the Chinese, 10 per cent of the foreigners, and 100 per cent of the Americans have not taken out cedulas, making the grand total of male inhabitants, between the ages of 18 and 45, 74,866, as follows:

Filipinos	43,780
Chinese	26,969
Foreigners	1,963
Americans	2,154
Total	74,866

Taking these figures as a basis, it is estimated that the total male Filipino population stated above may be multiplied by 5, the ratio of women and children to each male; the Chinese by 2.25; foreigners by 4, and the Americans by 3, thus resulting in a total of 293,894, as follows:

Filipinos	218,900
Chinese	60,680
Foreigners	7,852
Americans	6,462
Total	293,894

To this may be added the population of the post of Manila, including officers and enlisted men, making the grand total population of the city 297,154.

By an act of the United States Philippine Commission (June 29, 1901) the city limits were extended so as to include the villages of Santa Ana, San Felipe, and several other less important barrios. An estimate of the number of inhabitants included within the new limits is 5,000, almost entirely Filipinos, so that the population of the greater Manila on February 1, 1902, would be 302,154, as follows:

Filipinos:		
Previous estimates	218,900	
Barrios of Santa Ana, San Felipe, etc	5,000	
		223,900
Chinese		60,680
Foreigners		7,852
Americans:		
Previous estimate	6,462	
Post of Manila	3,260	
		9,722
Total		302,154

Our estimated population shows the total of Americans and foreigners to be 14,314. An accurate count of the American and foreign population, together with the figures taken from the immigration bureau for the year ending December 31, 1901, shows the actual number to be 14,236. Our new estimate likewise shows a slight increase in the number of Chinese. The total number counted one year ago was 51,643, while our present estimate, allowing 2.25 for each cedula issued, is 60,680. These figures correspond very closely to the estimate of the Chinese population by the Chinese consul. The greatest increase in our estimated population is found in the Filipinos, who are estimated at 218,900, while the number actually counted one year ago was 189,121. The estimated population therefore shows a slight increase over the census taken one year ago, at which time, owing to the conditions then existing brought about by the insurrection, etc., the count was very difficult.

It is not wholly unreasonable to assume that at the present time the population of Manila is about stationary. Many of those who were abroad and in the provinces during 1899 and 1900 have returned to Manila, and on the establishment of civil government last July, the conditions being favorable, many of the people who were forced into the city during the two preceding years returned to their homes in the provinces.

INSPECTION AND IMPROVEMENT OF PRIVATE AND PUBLIC BUILDINGS IN THE CITY OF MANILA.

An enormous amount of work has been done in the city during the past year in remodeling unsanitary houses, removing crowded shacks from interiors, and destroying huts and hovels which were declared by the board of health to be unfit for human habitation. About 600 houses of hard material were improved by the board in this manner, under the direction of Mr. H. D. Osgood, assistant sanitary engineer. His interesting report is attached hereto. (See Exhibit C.)

MATADERO.

For the report of the veterinary department, in regard to the inspection of animals in the city matadero, see Appendix F.

VACCINE INSTITUTE.

This institution is at present located in a large nipa building on the Calle Aguados, in the rear of the new Cosmopolitan Hospital, but will be transferred to the new building now under construction in the vicinity of the San Lazaro Hospital as soon as the same is completed.

The grounds near the San Lazaro Hospital selected for the vaccine institute will be suitable for both the vaccine and serum institutes, as there is a large tract of land in the vicinity, adapted for grazing purposes, which could be divided off by means of wire fences.

The institution is furnished with a stable that will accommodate six animals and the necessary tables for inoculating. The personnel of the institution is as follows: Señor Saturnino Espejo, director; Señor Ambrosio Espejo, assistant director; Angel Barbaza, clerk, and four servants necessary for feeding and caring for animals after inoculation.

The institute is at present well supplied with the necessary apparatus, consisting of mortars, pestles, flasks, sterilizers, etc. About 100,000 units of virus are turned out monthly, but this amount could be doubled or trebled, if necessary, by using more calves.

Carabao calves have been used for many years in the Philippine Islands for the production of virus and have always been very satisfactory. These animals are supposed to be more immune to tuberculosis than ordinary domestic cattle.

SERUM INSTITUTE.

The institution for the manufacture of prophylactic serums is situated on the grounds adjacent to the San Lazaro Hospital. The stables consist of stalls with cement floors and are capable of being made antiseptic. The accommodations are not sufficient for the care of the herd at present, and for this reason a contract was awarded several months ago for the construction of more capacious buildings. After inoculation the animals are turned out to graze in a lot adjoining the stable. The number of animals on hand at present is as follows: Australian steers, 4; native bullocks, 2; heifers, 9; horses, 3; sheep, 3; all of which are in good condition.

In June, 1900, two native horses were bought, one of which was inoculated with typhoid culture and the other with sterile plague. These were inoculated every week with an increasing dose of 50 c. c. The typhoid horse died October 4, 1900, and the plague horse in November, 1900.

In December, 1900, two native horses were bought, one of which was inoculated with sterile plague and the second with live plague. These animals were also inoculated every two weeks with an increasing dose of 50 c. c. The horse inoculated with sterile plague died March 11, 1901, and the one inoculated with live plague on February 20, 1901, both animals having reached a dose of 1,500 c. c. bullion culture six days old.

On March 3, 1901, a native horse was bought and inoculated with plague culture every two weeks until November, 1901, at which time the bullion culture was changed to a culture from tubes and the horse inoculated every other day. No further inoculations are being made on the horse at present on account of an abscess which developed at the point of the last inoculation. This horse will be in condition to draw blood in about two months. It will then supply about 500 c. c. every ten days.

On April 11, 1901, six American horses were received from the Army, having previously been condemned. Three of these animals were killed because they were found to be infected with glanders, and out of the remaining three one was inoculated with typhoid culture, which was given every other day until December 12. The inoculation was then changed to sterile plague, which has been continued up to the present. The second was inoculated with sterile plague every other day until December 20, when the inoculation was changed to live plague, which is being continued at the present time. These two horses will not be in condition to yield serum before ten months have elapsed.

In about four months the serum institute will be supplied with five animals capable of producing plague serum.

The number of rinderpest cattle should be increased to 150, and if no rinderpest can be found near Manila, secondary stations for these animals should be established where rinderpest-infected animals can be obtained and where the herd can be constantly inoculated. The immune animals could then be shipped to different parts for the purpose of extracting the serum, and rinderpest-infected animals or herds in which the infection has shown itself can be inoculated with serum and with rinderpest blood simultaneously.

From a standpoint of cost, the manufacture of plague serum with the limited number of horses on hand is at present not advantageous, and unless the plant be increased, it will be better, for the present, to purchase the serum from Japan.

Bubonic Plague in Manila from December, 1899, to March, 1902.

The first case of plague in Manila appeared on the 26th of December, 1899, and from that date to the 6th of March, 1902, when the disease was finally eradicated, 745 cases occurred in the city. The plague season in Manila, as a rule, is at its height from the 1st of March to the 1st of July, or during the dry, hot season, and the disease having disappeared at this time of the year it is more than probable that the infection has been completely eradicated. As plague is rarely absent in Hongkong it is believed that the infection reached the Philippine Islands from that port.

The following tables show the number of cases and deaths which occurred in Manila during the entire time that the disease was present in the city:

Number of plague cases during the years 1900, 1901, and 1902.

Months.	Cases.				Deaths.			
	Chinese.	Filipinos.	Americans.	Total.	Chinese.	Filipinos.	Americans.	Total.
1900.								
January	3	15	....	18	2	9	....	11
February	36	12	....	48	24	11	....	35
March	52	12	....	64	38	10	....	48
April	43	11	....	54	36	8	....	44
May	13	7	2	22	11	6	1	18
June	14	5	....	19	6	5	....	11
July	5	8	....	13	4	3	....	7
August	8	9	1	18	5	6	....	11
September	6	....	....	6	8	1	....	9
October	5	2	....	7	3	2	....	5
November	1	....	....	1	....	....	....	....
December	....	1	....	1	....	....	....	....
Total	186	82	3	271	137	61	1	199
1901.								
January	4	3	0	7	2	3	0	5
February	15	11	1	27	11	8	1	20
March	49	14	0	63	40	11	0	51
April	73	38	0	111	60	31	0	91
May	97	40	0	137	89	35	0	124
June	24	30	1	35	28	25	1	54
July	18	21	0	39	19	18	1	38
August	9	25	0	34	9	16	1	26
September	4	4	0	8	7	5	0	12
October	4	4	0	8	3	4	0	7
November	0	0	0	0	0	0	0	0
December	0	2	0	2	1	3	0	4
Total	297	192	2	471	269	159	4	432
1902.								
February	0	1	0	1	0	1	0	1
March	0	2	0	2	0	1	0	1
April	0	0	0	0	0	0	0	0
May	0	0	0	0	0	0	0	0
Total	0	3	0	3	0	2	0	2

As a rule, the disease affected the lowest class of the native and Chinese inhabitants of the city, and occurred in the most insanitary houses and districts.

Disposition of cases.—Every case found, if living, was sent to the plague hospital as soon as the diagnosis was verified by blood examination, and the bodies of the dead were sent to the board of health morgue for cremation, unless the friends interred the remains of the diseased in a hermetically sealed metallic casket, in compliance with the rules of the board of health. A large number of the cases which occurred in the city were found dead, and microscopical examinations were made in every case for verification. In order that no case might escape the vigilance of the board of health, medical inspectors were directed to examine all dead bodies found in the city where there was any suspicion of the disease.

The following measures were adopted by the board of health for the eradication of plague: First, remodeling, cleaning out, and disinfection of all houses in the city in which plague cases occurred, or in which rats affected with the disease were found. Second, the destruction of rats by means of traps and poisons. Third, the immunization of the lower classes, among whom the disease usually occurred, by means of the Shiga antiseptic vaccine. Fourth, the thorough cleaning and disinfection of all filthy habitations in the city. Fifth, the prevention of overcrowding. It is believed that it was only by enforcing the above measures, and the exercise of eternal vigilance on the part of the sanitary inspectors, that the infection was eliminated from the city.

In view of the association between plague and rodents, an incessant war was waged against the latter from September, 1901, until the disappearance of the disease. Squads of rat-catchers, armed with rat traps, rat bane, and other necessary implements, were assigned to the various districts, under the supervision of the district sanitary inspectors. These squads generally consisted of 10 rat-catchers, with a chief, who became responsible for the placing of traps, bane, and the collection of rats. In addition to the above methods of catching rats, a per capita fee of 5 cents Mexican was paid for every rat sent to the laboratory by persons not connected with the board. From September until the 1st of March, over 50,000 rats were secured by means of traps. Besides these, several hundred thousand were disposed of by means of poison.

The following rules and regulations were promulgated by the board of health in regard to rat catching in the city of Manila, and for the government of rat catchers:

RULES AND REGULATIONS GOVERNING RAT CATCHING IN MANILA, AND THE DISINFECTION OF HOUSES FOUND INFECTED BY RATS SUFFERING FROM PLAGUE.

"SEC. 1. For the purpose of catching rats and submitting them to the laboratory for examination, the chief health inspector is herewith authorized to employ 40 natives, and to increase their number from time to time as required.

"SEC. 2. Each member of the rat-catching corps shall wear a prescribed uniform, consisting of a blouse, trousers, and cap of uniform material selected by the commissioner of public health. He will also wear a brass shield over the left breast bearing office and number. The uniform shall be worn continuously while on duty.

"SEC. 3. The corps will be divided into squads of two and assigned by the chief health inspector to the various districts throughout the city, which districts shall correspond to those assigned to chief sanitary inspectors.

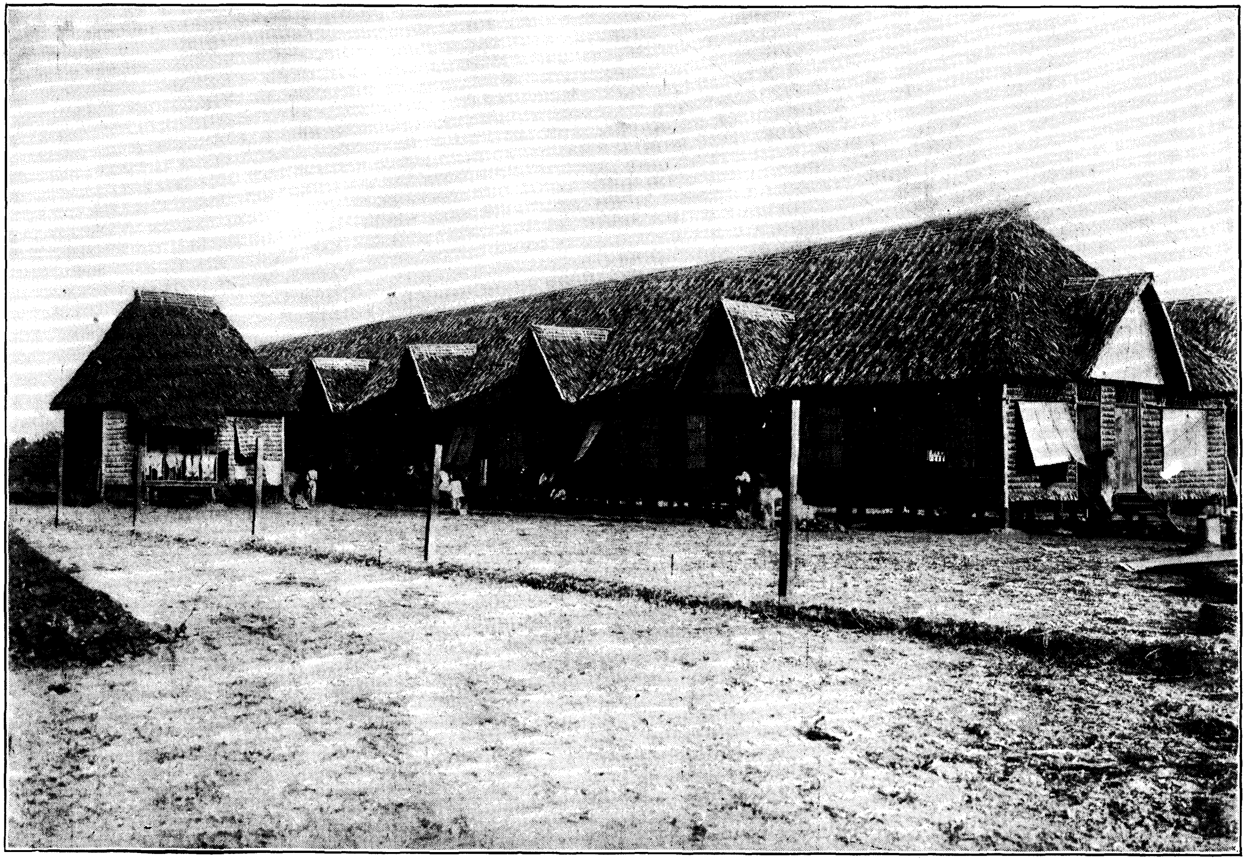
"SEC. 4. Members of the rat-catching corps will report daily, at 10 a. m., to the office of the chief sanitary inspector of each district for the purpose of receiving instructions and rendering reports. Each squad will be provided with two galvanized iron buckets with covers, one for containing the disinfecting solution and the other for receiving dead rats; one hundred rat-bane tins and receptacles for carrying the same, for which property each squad will be responsible. The rat bane will be prepared daily at the municipal laboratory, and the dead rats returned there for examination and cremation.

"SEC. 5. The corps of rat catchers will distribute rat bane in prescribed sections of the city, beginning the distribution not earlier than 8 p. m., and removing the same the following morning, beginning the work not later than 5.30 a. m. They will also collect all the dead rats on the premises, disinfecting the same in the solution furnished, tag and deliver them to the municipal laboratory for examination and other disposition. Members of the corps will explain to the inmates of the house or premises the object and purpose of placing the rat bane and the dangers in handling or disturbing the same; he will also advise them to see that domestic animals about the house and children are kept away from it during the prescribed hours for baiting rats. They will also explain to the native inmates the dangers arising from houses infested with rats affected with bubonic plague.

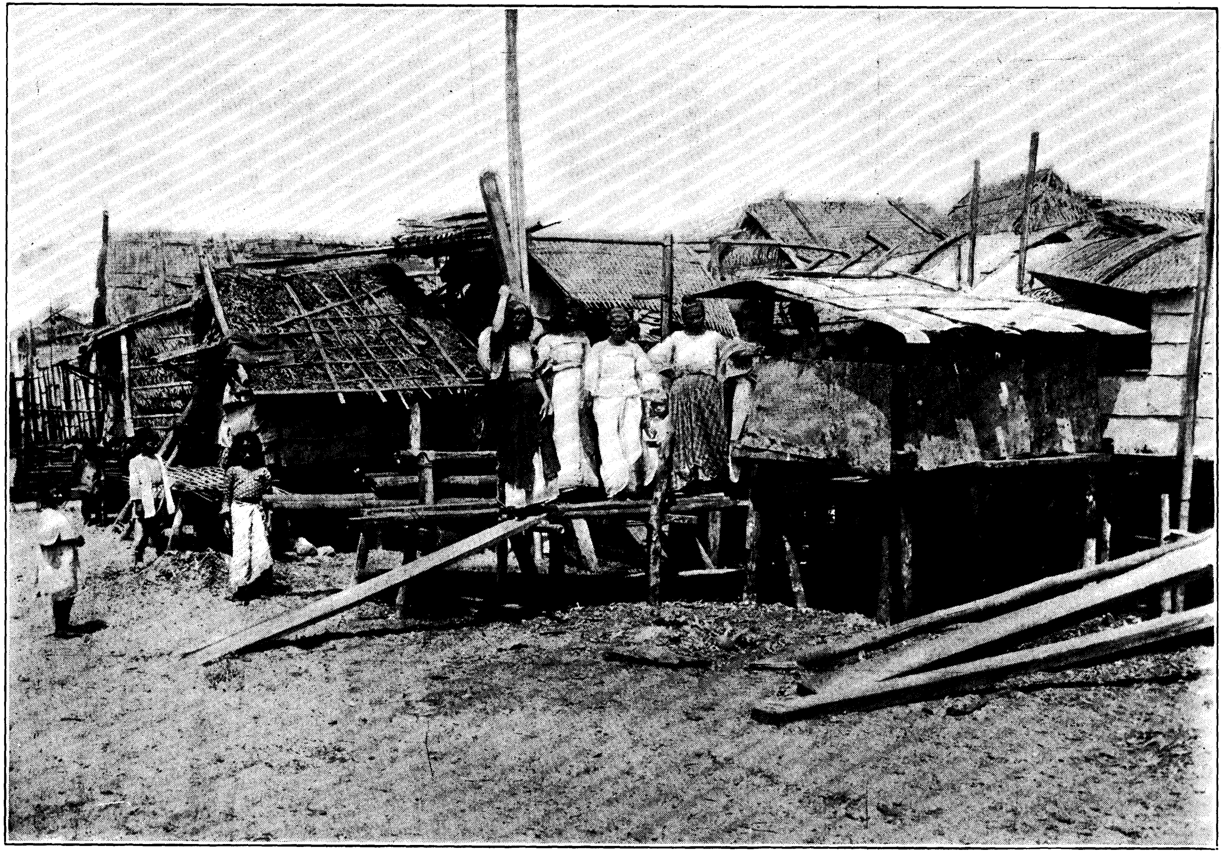
"SEC. 6. The chief of police will be requested to instruct the members of his force to see that all dead rats found are properly tagged and turned over to the rat-catching corps for treatment as prescribed above, and to see that any person otherwise disposing of rats or disturbing rat bane distributed by the corps will be arrested."

Of the 60,000 rats sent to the laboratory, 40,666 were examined microscopically for bacilli, and of these 242 were found infested with plague. It was observed that from November the percentage of rats infected with plague rapidly decreased. During November and December, on certain days, plague rats amounted to 3 or 4 per cent of those delivered, but they diminished to about one-tenth of 1 per cent during the latter part of February and finally disappeared altogether during the early part of March.

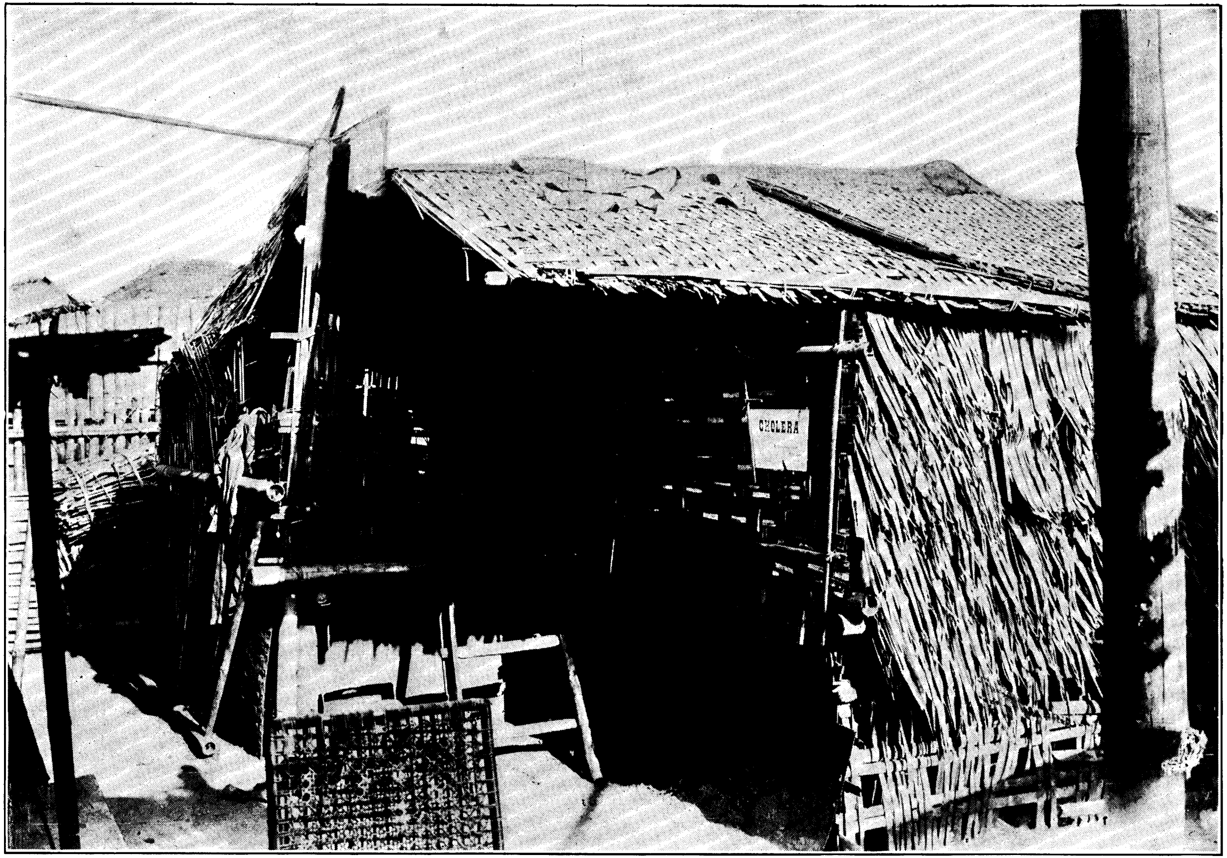
During the month of February the aggregate number of traps set amounted to 65,379, and that of plates of rat bane placed to 403,789. The streets of each district were visited in order and traps and bane placed in each house for three days and nights consecutively. The following methods were employed for catching or destroying rats: First, traps baited with bacon, fish, cheese, meat scraps, or boiled rice. Second, by hand. In this case the rat catchers run their arms into the holes, rat runs, or sewers, or caught them after they were driven out of old lumber piles, or from under shacks that were being removed. In some instances the rat catchers were badly bitten, but excepting a slight phlegmonous inflammation no serious results followed. Third, by means of nets placed over holes or sewers into which the rats had been driven by hot water, carbolic solution, or the fumes of sulphur. Fourth, by the use of poisoned foods. The following poisons were used with more or less success: (1) Prepared rat cheese; (2) ratbane; (3) a mixture containing ground glass, flour, corn meal, sirup, with 1 per cent of strychnine; (4)ground rusty bacon with 60 per cent of arsenious acid; (5) boiled rice, with 60 per cent of arsenious acid; (6)



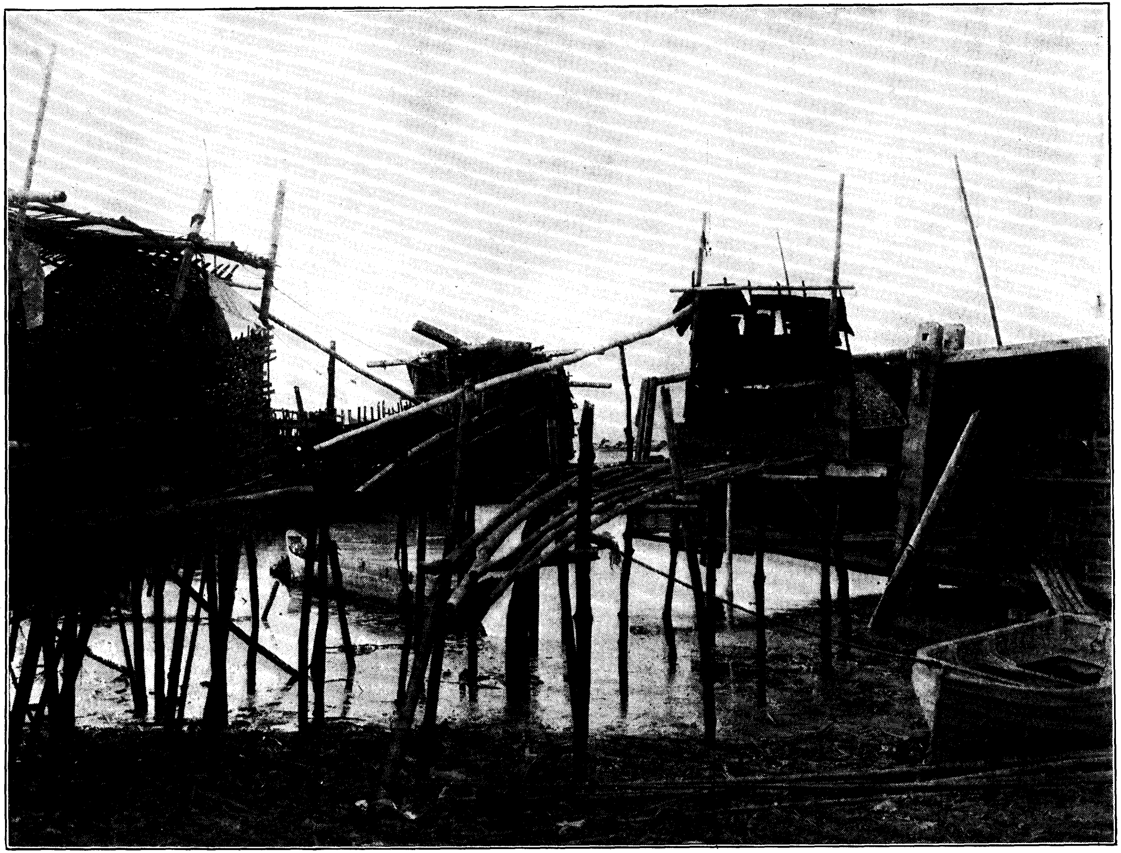
BARRACK IN CHOLERA DETENTION CAMP AT SAN LAZARO—REAR VIEW, BATH HOUSE AT LEFT.



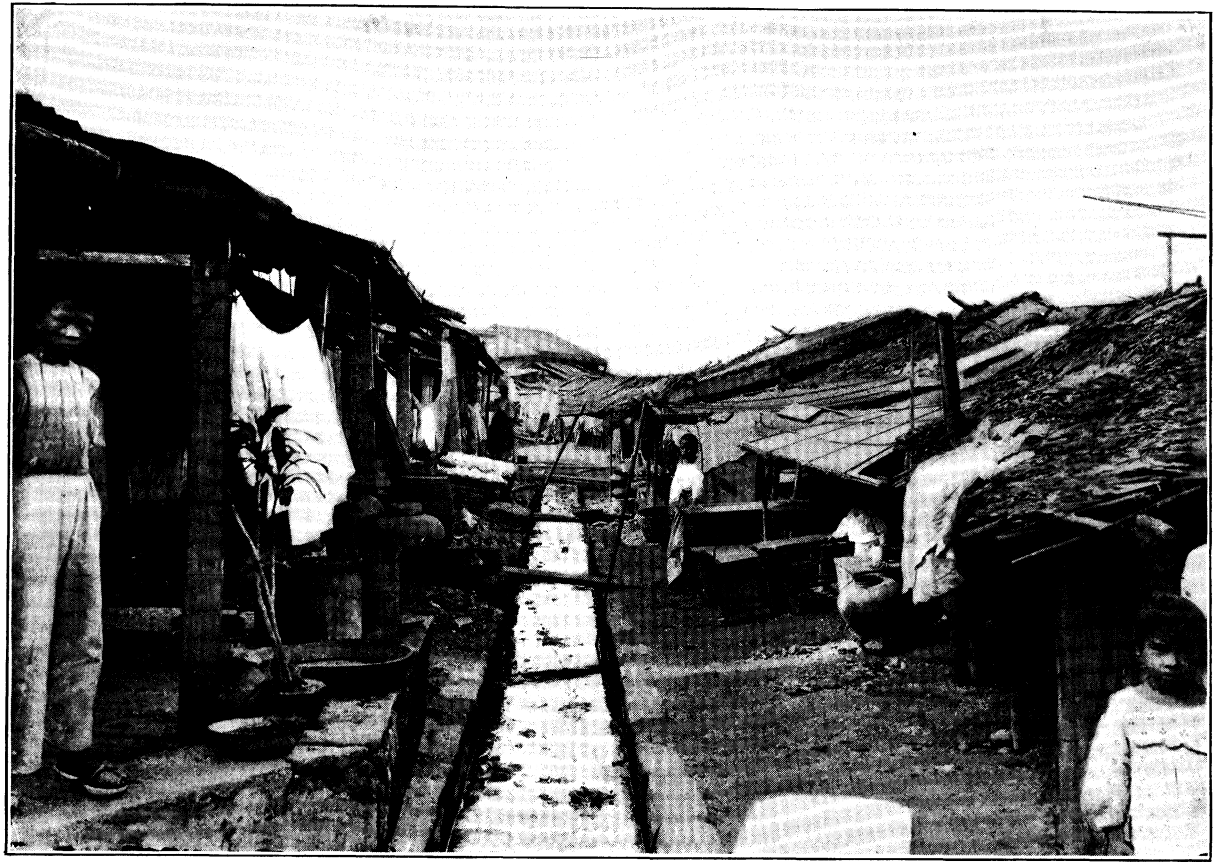
A TYPICAL CHOLERA CENTER.



A TYPICAL CHOLERA "SHACK."



TYPICAL NATIVE WATER-CLOSETS.



NATIVE MARKET, SHOWING "SHACKS" BACKING UP AGAINST FILTHY OPEN DRAIN.

dish of flour and plaster of paris, equal parts, with a dish of water on the side. Death from the last-mentioned method was produced mechanically.

A letter was received from Professor Kitasato, of Japan, on the subject of rat catching, in which he stated that great difficulty was experienced there in destroying rats, and that on account of their wariness it was not only necessary to change the character of food containing the poison from time to time, but the traps as well. Boiled rice with arsenic was found quite popular with the rats, but the best results were obtained from the rusty bacon preparation. The number of rats destroyed by bane is not known, but it is believed that several hundred thousand were destroyed in this way. All rats sent to the laboratory were carefully examined microscopically for infection, and in case the bacilli were found, the houses and premises in which the infected rats were caught were treated as if a case of plague had occurred there. The character of the buildings of Manila and their crowded condition offer every opportunity for the growth and increase of rodents. The nipa colonies within the city limits also afford a splendid place for their propagation.

Shiga antipestic vaccination.—A systematic effort was made to immunize the susceptibles of Manila against bubonic plague by means of the Shiga antipestic vaccine. The work was begun on the 15th of January. From that date until the 15th of March over 25,000 persons were inoculated, especially those living in Intramuros, Binondo, San Nicolas, Tondo, Quiapo, and Santa Cruz. The lower classes, including the Chinese, cocheros, laborers, servants, peddlers, etc., with their wives and children, who are the occupants of the lower floors and nipa houses, were especially selected for immunization. The government laboratory furnished from two to three hundred doses of the antipestic vaccine daily, but on account of the large number requiring immunization, it was necessary to cable Professor Kitasato, of Tokyo, for additional vaccine, and 50,000 doses were received from that source. The work was performed by native physicians, under the direction of Dr. J. V. Tormey, medical inspector.

Since the appearance of plague in Manila cases have occurred, or rats affected with the disease have been found, in over 500 houses. In order to make a thorough disinfection and cleaning up of these houses the board of health submitted the following resolution to the municipal board, which was enacted as an ordinance:

RESOLUTIONS OF THE BOARD OF HEALTH FOR THE PHILIPPINE ISLANDS AND CITY OF MANILA ADOPTED DECEMBER 3, 1901.

"Whereas the following houses in which cases of plague have been found, or in which rats affected with plague have been caught, are foci of bubonic plague and capable of spreading this disease in the community, and are therefore a menace to the public health, they are hereby declared nuisances: Be it therefore

"*Resolved*, That the owners or agents of said houses or premises are hereby directed to abate such nuisances, under the supervision and direction of the board of health, by removing all wooden floors in the basements, cellars, or storerooms and substituting therefor concrete or other hard materials, such as stone, tile, brick, etc.; to remove partitions and other parts of the structure which may be recommended by the board of health; and to remodel and place these buildings in a sanitary condition satisfactory to the board of health and as near ratpoof as possible; to apply paint or whitewash wherever directed; and that said houses in which cases of plague have been found, or rats affected with this disease, shall be immediately vacated, within fifteen days of the time of serving legal notice to vacate said premises, and remain vacated until the board of health issues a certificate certifying that said buildings have been repaired according to the directions of the board and are safe for reoccupancy. Be it further

"*Resolved*, That if, after a thorough examination, it has been found that any building declared a nuisance within the meaning of this resolution, on account of plague, can not be repaired and placed in a satisfactory sanitary condition and at the same time made fit for human habitation or for purposes of legitimate business, such building shall be torn down. Be it further

"*Resolved*, That in the event the owners, agents, or occupants, or any of them, are unable financially to make these repairs or refuse to do so, the work shall be done by the city of Manila and the city attorney directed to institute proceedings against such delinquent property owners or agents to recover the amount expended by the city. Be it further

"*Resolved*, That a copy of this resolution be immediately submitted to the municipal board of the city of Manila, recommending that an ordnance be enacted providing for the enforcement of this resolution."

As a result of this ordinance over 600 houses were remodeled, cleaned, and placed in habitable condition, and in a number of instances the owners were put to an expense of from $500 to $3,000 to make suitable repairs.

DETENTION VILLAGE.

During the month of November, 1901, contracts were awarded for the construction of a detention village, consisting of 1 superintendent's house, 1 guardhouse, 5 private houses, and 3 large dwellings. A large piece of ground south of the San Lazaro hospital was selected as a site for the camp, and the buildings were constructed of cane and nipa. The houses are well built, ornamental in appearance, and supplied with water, water-closets, kitchens, bathrooms, etc. During the months of February and March three additional large buildings were constructed. During the recent cholera epidemic they served a very useful purpose as a camp of detention for cholera contacts.

The following circulars were issued by the board to aid in diagnosticating plague and for the information of the public:

[Circular letter No. 3.]

OFFICE OF THE BOARD OF HEALTH,
Manila, P. I., March 7, 1901.

A brief synopsis of bubonic plague for early diagnosis, three varieties: (1) With bubo, (2) without bubo, (3) pneumonic.

1. *With bubo.*—These constitute one-half the cases and vary in severity from comparatively mild to severe.

2. *Without bubo.*—This class is more uncommon and includes those cases in which, either from an overwhelming dose of the poison or from a weak resisting power, death occurs before bubo formation in twelve to twenty-four hours from onset of disease.

3. *Pneumonic.*—This type has been rare in Manila—not above 2 per cent of the total number of cases. These cases all die very early. They do not have bubos, but a broncho-pneumonia.

Any of the three varieties may be hemorrhagous, indicating always a severe infection.

The symptoms to be carefully looked for are outlined below:

NERVOUS SYSTEM.

Headache: Usually early, severe, frontal.
Delirium: Often early; may become muttering or maniacal.
Coma: In bad cases early.
Muscular prostration: Usually early, from severe toxemia.

DIGESTIVE SYSTEM.

Tongue: Usually dry, with thick, gray coating.
Pharynx: Commonly congested.
Enlarged tonsils: Rare.
Nausea: Common.
Vomiting: More often nausea, but also common; either green, brown, or bright red.
Diarrhea, constipation: Either.
Involuntary stools: Not uncommon.
Abdominal pain: Occasional, from involvement of mesenteric glands.
Hemorrhage from mouth or intestines: In hemorrhagic cases only.

RESPIRATORY SYSTEM.

Epistaxis: Common in all varieties.
Lung involvement: In pneumonia variety, broncho-pneumonia.
Respiratory rate: Usually rapid, often 40–50, from pulmonary congestion; characteristic in typical cases.
Cough: Common.
Hemorrhage: Hemorrhagic cases.
Character sputum: In pneumonic cases, usually like broncho-pneumonia, blood streaked.

CIRCULATORY SYSTEM.

Condition of heart: As in other severe fevers.
Character of pulse: Early, weak, and dicrotic.
Rate of pulse: 110–180.
Dilation of superficial veins: Very common.

CUTANEOUS SYSTEM.

Hemorrhages: In hemorrhagic cases, usual site face, hands, and over shoulders; size, petechiæ to one-half cm.; character, usually look like mosquito bite, but may be dark purple; any scratch in these cases shows hemorrhages in edges.
Pustules: Rare, any site, may be multiple.
Carbuncles: Very common, any site, may be multiple.
Conjunctivæ: Injected.

LYMPHATIC SYSTEM.

Primary glands affected: Usually single glands, or single group; most common, femoral or inguinal; next, axillary; then anterior cervical.
Associated glands: Rarely severe.
Character of skin over infected bubo: Rarely reddened.
Suppurating bubo: Very rare till late in the disease.
Lymphangitis: Rare.
Involved glands are always very painful and tender, and often have a surrounding œdema. In femoral glands this may extend from knee to lower ribs.

TEMPERATURE.

May be elevated to 105 or even 106 F. May or may not be initial chill or chills, or chills may continue at intervals throughout disease. Temperature not frequently shows an intermittent or remittent character.

FACIAL EXPRESSION.

Usually curious, mixed fear, dread, and suffering.

MICROSCOPE.

Early leucocytosis.

In Manila the organism has been found in 90 per cent of bloods examined; use any common stain—methyl blue, gentian violet.

Plague, in an atypical case, is extremely difficult to diagnose, and in the presence of the disease any fever should be looked upon with suspicion. The certainty of other disease existing does not in any way negative plague, as it may engraft itself on any of the common diseases, as typhoid, tuberculosis, malaria, etc. It is important to remember that the absence of bubo does not exclude plague.

THE AMBULATORY TYPE OF PLAGUE.

The attention of all physicians is called to the necessity for extreme caution in the differentiation of cases of ambulatory plague. This type is frequently encountered, especially among the Chinese, who keep up much longer in severe illness than the other races here. Cases running their course within six hours are not uncommon, and a much less period before death may elapse after the severity of this disease is manifest. Deaths even occur absolutely without antecedent symptoms, the persons falling dead while at work, possibly without apparent cause, or it may be from a trivial injury which, though unimportant, proves too much for a heart degenerated by the powerful toxines of plague. That these cases are true plague is borne out by the recent investigations of the board of health, autopsies resulting in the finding of the plague bacillus and the characteristic pathological changes.

[Circular Letter No. 11.]

HEADQUARTERS PROVOST-MARSHAL-GENERAL,
OFFICE OF THE BOARD OF HEALTH,
Manila, P. I., June 30, 1901.

At the close of the present slight epidemic of bubonic plague in this city and the frequent occurrence of sporadic cases in many of the provincial towns and pueblos the following, based upon the experiences of the board of health during the past eighteen months, is published for the information of all concerned.

TRANSMISSION OF THE PLAGUE.

The plague bacillus is found in the pus of buboes, abscesses, wounds, expectorations, stools, urine, and blood of patients. It is carried by rats, mice, flies, and parasites; transmitted by all articles of clothing, body linen, bedding, rags, feathers, wool, untanned hides, and articles of furniture, food and drink, atmosphere in infected houses, and street dust; in the pulmonary form from person to person by means of the sputum. Plague may be carried to a distance by any of the above intermediaries; also by rats, convalescents, and by patients with the milder forms of the disease, the so-called pestis minor. The germ very frequently gains an entrance into the body through wounds, excoriations, cracks, and crevices of the skin.

COURSE TO BE PURSUED WHEN A SUSPECTED OR A GENUINE CASE OF PLAGUE GAINS ACCESS TO A TOWN OR LOCALITY.

All suspected cases of plague and all sudden deaths should be examined for glandular swellings or abscesses in groins, armpits, and neck, and reported to the proper health authorities.

At the present time sporadic cases of pestis ambulans and pestis minor are occurring, not only in this city, but in the provinces, which are unrecognized, and excite no suspicion of their true nature. The present epidemic warrants the observation that these milder cases (pestis minor) proceed, run concurrently with, and are now continuing after, the true and severe types of plague. These are the cases which are scattering and implanting the disease throughout the island and to which the attention of the medical profession is thus early called.

In towns or localities threatened with plague all febrile cases which show glandular enlargements, grave pulmonary symptoms, or symptoms of a severe septic infection, with high fever and collapse, should be reported at once and submitted to a bacteriological examination.

ISOLATION AND DISINFECTION.

All plague cases should be isolated, as well as those who have been living in the infected buildings and premises. Keep patient in state of utmost cleanliness. Only those in charge of the case should be admitted to the infected house. All furniture and wearing apparel should be removed from the sick room. Allow no dust or dirt to accumulate; the floor of the room should be washed or mopped daily with disinfecting solution (5 per cent solution of carbolic acid). Keep sick room thoroughly ventilated and open to sunlight; clothes, coverings, bedding, etc., to be disinfected by boiling as often as they accumulate. Destroy by fire all valueless clothing and other effects exposed to infection; those in charge of the case should take neither food nor drink in the sick room; frequently wash hands and face with disinfecting solution, particularly before eating. Patients convalescing should be isolated for a period of thirty days after all symptoms of the disease have disappeared; period of detention for persons exposed to infection should not be less than twelve days.

The disinfectants recommended are corrosive sublimate used in a strength of 1 per 1,000, with the addition of 2 parts per 1,000 of common salt or hydrochloric acid.

Carbolic acid 5 per 100; solution of sulphate of copper and chloride of lime 5 per 100.

Washing the face and hands, use the sublimate solution 1 per 1,000; rinsing the mouth use a solution of hydrochloric acid 4 per 1,000.

Vomited matter and fecal matter are to be immediately disinfected with either the solution of sulphate of copper, chloride of lime, or the milk of lime made from a good quality of lime, 20 parts lime to 100 parts water. A small quantity of one of these solutions should be placed in the bedpan or other vessel before being used by the patient. If dejecta are thrown into water-closets or latrines, these should be disinfected daily by one of these solutions. Immediately burn all dressings from buboes and ulcers. Soiled body linen should be immersed for one hour in a sublimate or carbolic solution, or in boiling water for one-half hour. Furniture should be washed in one of the disinfecting solutions. Corpses should be at once placed in air-tight coffins, surrounded by caustic lime, or by sawdust wet with one of the disinfecting solutions and interred at once. There must be no public funeral.

PUBLIC HYGIENE.

Purity of water supply to be watched with great care; during prevalence of plague drink boiled water only; water from surface wells to be forbidden for any domestic purposes whatsoever; the rules of general hygiene, applicable at all times, should be rigidly observed in times of plague; the destruction of rats and other rodents; prohibiting the congregation of individuals at fairs, celebrations, and pilgrimages; the surveillance and supervision of markets; the cleanliness of the soil; the regular removal of garbage; the cleanliness of habitations; the particular supervision of places, workshops, forges, etc., intended for occupancy by the laboring and industrial classes; the cleaning and regular disinfection of water-closets, public and private; supervision and disinfection of latrines and cesspools.

Particular emphasis is to be laid upon the fact that wearing of shoes and stockings is an important factor in preventing plague gaining an entrance into the body through wounds, etc., on bare legs and feet.

The spread of the disease by rats and other rodents is a fact comparatively new to practical hygiene. Premises infested with rats are a menace to public safety, and must be dealt with summarily, requiring the owner, agent, or occupant to remove wooden floors in basements, cellars, storerooms, etc., and to substitute concrete and other hard materials, such as stone, tile, brick, etc.; to repair walls and other badly constructed or decaying structures; to effectually stop holes, and protect small windows and other openings on ground floors by wire netting; to remove all accumulations of lumber and other refuse from yards. Rats live and breed in dirt, decay, and darkness, dampness, and filth, and the same places are infested with fleas, bugs, and other parasitical insects, all capable of transmitting plague. Burn accumulations of rat manure.

PESTIS MINOR.

In order that physicians may be on the lookout for this mild form of the disease the following description is given:

Pestis minor is a fairly well-defined ailment, often proceeding many months or continuing after an epidemic of plague; at other times appearing sporadically.

The buboes or glandular swellings are painful and go on to suppuration or resolution. There is disturbance of digestion, headache, and dizziness, sleeplessness, and more or less fever. The more or less debility or exhaustion accompanying these cases, together with painful glandular enlargements, are prominent features which warrant the term "pestis minor." The bacilli are usually few in number and wanting in the virulence of true plague. They are found in the glandular swellings and less often in the blood.

Pestis minor is an attenuated form of true plague, and under favorable conditions may give rise to an epidemic of magnitude. Here is a parallelism with certain other infectious diseases, notably pseudo-diphtheria of the Temperate Zone, which exists in an attenuated or modified form. Hence the necessity of recognizing the condition. Many of the ills of children with febrile symptoms and general adenitis now being grouped under the general term "glandular fever" would no doubt after a bacteriological examination be placed in the category of plague as "pestis minor."

EPIDEMIC OF ASIATIC CHOLERA IN THE CITY OF MANILA AND THE PHILIPPINE ISLANDS BEGINNING MARCH 20, 1902.

At 2.30 p. m., March 20, the board of health was advised by the authorities of the San Juan de Dios Hospital that two patients had been received in that hospital for treatment whose cases resembled very much Asiatic cholera. Inasmuch as the disease was epidemic at the time in Canton and Hongkong and there was a constant and very considerable commerce between the latter port and Manila, the invasion of cholera was not altogether unexpected, although a quarantine had been placed on all vessels entering the bay of Manila from Chinese ports.

In company with the late Maj. F. A. Meacham, chief health inspector, and Prof. Paul C. Freer, superintendent of government laboratories, I visited the hospital shortly after receiving notice, for the purpose of verifying the report, and found two natives, one a resident of Intramuros, the other of San Nicolas, ill of a disease which appeared to us to be Asiatic cholera. Dr. R. P. Strong, director of the biological laboratory, was at once sent for in order that bacteriological examinations of the patients' dejecta might be made. Such examinations were made and the presence of the comma bacillus observed in hanging drop slides. Later on the disease was verified by cultures made in the laboratory. The same night two other cases were reported in the Ferola district, both of which died within a few hours after attack; and before investigations had been completed ten or twelve more typical cases of cholera had occurred, which clinically placed the diagnosis beyond doubt.

Major Meacham, chief health inspector, who had spent the month of February in Hongkong and Canton, returned to Manila on the 5th of March and reported that cholera was very prevalent in Canton, although its extent was unknown, for the reason that no health board existed there and that the number of deaths occurring daily were only to be secured by visiting the undertakers' establishments and counting the number of coffins sold during the day. He also reported that cholera existed in Hongkong at the time of his departure from that port, although very little was said about it, probably for the purpose of protecting commerce, which would have suffered severely had the conditions been generally known.

On March 3 Capt. J. C. Perry, Marine-Hospital Service, chief quarantine officer of the port of Manila, cabled Hongkong to prevent the further introduction of vegetables from that port, at the same time imposing a five days' detention at Mariveles on all ships arriving therefrom. It is believed that in spite of these orders infected vegetables were shipped later and smuggled into Manila, or thrown overboard from the vessels, washed ashore, and eaten by the natives.

The Farola barrio, which lies at the extreme western border of the San Nicolas district, and along the Pasig River to the Manila light, was the point where the infection was first located. Several of the natives informed members of the board of health that cabbage and other green vegetables had been picked up on the shore previously and used for food. It is more than probable that the infection entered the city in this way.

One hundred and two cases occurred during the first ten days of the epidemic, the most of which were found in the Farola district, and as it was believed that the infection was principally confined to that section of the city, the board of health recommended its destruction, which was done by fire on March 27, the residents of the district being sent to the San Lazaro detention camp.

MEASURES ADOPTED FOR SUPPRESSING CHOLERA IN MANILA.

The city was divided into 12 districts for the purpose of sanitary inspection, and each district was placed under the charge of a medical officer, who had under him a corps of sanitary inspectors varying from 30 to 60. During the early part of the epidemic house-to-house inspections were made both day and night in order to prevent cases from escaping the notice of the board. This became necessary in order to detect cases which were being hidden by the natives, presumably to prevent being sent to the detention camp. A request was made on the division commander for the detail of medical officers, and from time to time such as could be spared by the chief surgeon of the division were ordered to report to the commissioner of public health. During the epidemic 34 medical officers, principally volunteer and contract surgeons, were ordered to report for duty with the board of health and were assigned as district medical inspectors in Manila, quarantine officers on the bay, rivers, and esteros, or in charge of cholera hospitals and detention camps. Ten or twelve later on were sent to the provinces—to Bulacan, Pampanga, Bataan, Cavite, and Laguna. Each district medical inspector was supplied with a disinfecting pump, disinfectants, and a corps of men versed in that special work. Each house in which a case of cholera occurred after the case and contacts had been removed was thoroughly disinfected and closed for occupancy for five days.

The following additional measures were taken:

First. All wells throughout the city were closed and distilled water distributed for drinking purposes.

Second. Certain fruits, vegetables, and other articles of diet were prohibited.

Third. All hotels, boarding houses, lodging houses, and saloons were prohibited from using for drinking purposes water that had not been either boiled or distilled; well-known mineral waters and aerated waters made of distilled water being allowed.

Fourth. A rigorous quarantine was placed around the city of Manila, to prevent infected persons from escaping to neighboring towns on the bay.

Fifth. All cascos, lorchas, barges, launches, and other floating craft were required to move out from the Pasig River and esteros after 5 p. m. and remain in the bay during the night; and before being allowed to return to their wharves in the morning they were thoroughly inspected. This measure became necessary for the reason that a large number of cases of cholera occurred on such shipping without being reported to the board of health, the dead bodies in such cases being disposed of by being thrown overboard during the night, in order to escape detention.

Sixth. The Mariquina River, from which the city water is obtained, was thoroughly guarded by a patrol of regular troops. The pueblos of Montalbon, San Mateo, and Mariquina are located on this stream, above the intake, and hence, to prevent infection of the water supply, the most rigid inspections of these towns became necessary.

In spite of the great precautions taken to effectively quarantine the city and guard against the escape of persons affected with the disease to neighboring provinces, many escaped in bancas during the night to the provinces of Bulacan, Cavite, Pampanga, and Bataan, and the U. S. transport *Castellanos* carried the infection to Neuva Caceres, Ambos Camarines, from which source it was transmitted to a large number of pueblos in that section.

As a rule, the disease occurred among the lowest social stratum of the city's inhabitants, and unquestionably resulted from food infection. The water of the city has been examined from time to time, but remains uninfected.

During the first two or three weeks of the epidemic there was a general disposition on the part of the population to conceal every case of cholera which occurred. A certain class of people, including the Spanish doctors and friars, even went so far as to deny the existence of cholera. It was generally suggested to the natives by these people that the disease was colic, resulting from the use of green rice, and that the Americans resorted to such extreme measures as were taken unnecessarily and probably for reasons of revenge. Whether it was because the natives did not believe that cholera existed in the city, or whether they were afraid of the measures taken by the board of health to stamp out the infection, it was found impossible to secure their cooperation in regard to reporting cases. They resorted to every measure possible in order to conceal them—removing them during the night into the rice fields, driving patients out of the houses into the streets, and disposing of the dead by throwing the bodies into the Pasig River and esteros, or burying them under woodpiles or in other places.

From the beginning of the epidemic all cases with but few exceptions were treated in cholera hospitals organized by the board of health. From March 26 to April 18 the cases were sent to the hospitals established on the San Lazaro grounds and the contacts to the detention camp adjoining, which had been previously constructed for bubonic plague contacts. On April 12 the detention camp and cholera hospital at San Lazaro were abandoned and a new camp and hospital established on a high tract of land in the suburbs of Manila known as Santa Mesa. The use of this magnificent piece of property was secured to the board of health, without cost, through the generosity of Señor Juan Tuason, a very prominent and public-spirited Filipino resident of Manila. The Santa Mesa detention camp was provided with accommodations for 6,000 contacts, and the hospital adjoining for 100 patients. The grounds were laid out and tents erected according to military regulations, and the camp provided with a system of water supply taken from the main conduit at that point, with bath houses, sanitary closets, kitchens, storerooms, etc. The detention camp and cholera hospital at Santa Mesa were in operation from April 14 to May 9, and were finally abandoned on account of the distance from the center of the city and the rough avenue leading to them, it having been found that the long and tedious journey to the camp had a bad effect on the patient.

During the existence of this camp 527 contacts and 186 cholera cases were sent there for detention and treatment. The management of the Santa Mesa Camp passed through several hands before it was finally transferred to Capt. T. R. Marshall, assistant surgeon of volunteers, who administered it with rare ability, and who deserves great credit for his work. Contract Surg. R. E. Sievers, U. S. Army, had charge of the cholera hospital, and performed his duties in a most creditable and satisfactory manner.

Before the abandonment of the Santa Mesa cholera camp, arrangements were made to establish a hospital in a large building on the Calle Herran, formerly used by the army, and then known as the Second Reserve Hospital. This magnificent building is located in the center of a large tract of land surrounded by a wall, and is very accessible from all parts of the city. It is believed that a considerable number of lives were saved by reason of the dispatch with which patients could be transferred to this hospital and the easiness of the journey, owing to the fine condition of the streets leading to it. The use of this building was secured to the board of health through the courtesy and kindness of Señors Trinidad Jurado, Bertrand de Lis, and other members of the commission of the Spanish colony, who had charge of the property at the time. The entire lower floor, with kitchen, dining room, laundry, morgue, and grounds were placed at our disposal, besides a large ward for Americans on the second floor, and four private rooms for American women, also, above. The remaining portion of the building was reserved for the treatment of the members of the Spanish colony in case any of them were so unfortunate as to contract the disease. I desire publicly to thank Señor Trinidad Jurado and his colleagues for their great kindness in offering us this splendid hospital, which has contributed so largely toward the recovery and comfort of the unfortunates sent there, and for their universal courtesy and assistance during our occupancy of the building. In this connection I also desire to call attention to the splendid work performed by the Sisters of Charity who were sent there as nurses at my request. These noble women devoted themselves fearlessly to the work of nursing the sick, and spared no effort of labor in behalf of their patients, who, as a rule, belonged to the lowest class of the natives, and among whom the disease was so malignant.

Capt. E. A. Southall, assistant surgeon, U. S. Volunteers, was placed in charge of this hospital from its organization, and although suffering from chronic dysentery the entire time that he was on duty there, administered affairs with judgment and marked success. A number of hospital tents were pitched on the grounds for the accommodation of relatives of patients under treatment. This concession was made to the ignorant classes to offset the many vague and fearful rumors which had reached them in regard to the treatment of their friends by the Americans. One member of each family was provided with shelter and food on the grounds, and allowed to visit the ward once or twice daily. This policy to a large extent relieved the natives of that fear which they entertained of being sent to the cholera hospital.

There was practically no cooperation among the natives in regard to reporting cases occurring in their families, and for this reason it became necessary to employ a large number of men acting as sanitary inspectors, several hundred of whom were sent to infected towns in neighboring provinces.

After a careful study of statistics in regard to the percentage of contacts who were infected after being sent to the detention camp, the board decided, when practicable, to quarantine all contacts for five days in their houses, and to abolish the detention camp altogether. This was accomplished May 14; no injurious effects, as far as could be ascertained, following in regard to an increase in the epidemic; in fact, a marked improvement, in securing the confidence and cooperation of the natives. All cases, however, were sent to the cholera hospital.

Since it has been definitely determined that cholera results from food infection, great attention has been paid to the supervision of the markets, the cooked-food shops, and the preparation and care of foods in the native houses. Rules and regulations were issued prohibiting the peddling of all drinks and cooked foods on the streets. The prohibition of 23 special articles of diet prepared by the Chinese for sale to the natives, and a rigid enforcement of an order for keeping all articles of diet on the city covered and free from flies, brought good results. Although the enforcement of these rules was very difficult among a population of 300,000 people, 275,000 of whom may be regarded as belonging to an ignorant class with scarcely any knowledge of ordinary sanitation, a marked decrease in the number of cases was soon noted.

Many samples of foods and a number of flies caught in infected houses were sent to the laboratory for examination. The cholera spirillum was found in several samples of the food, especially in the cooked rice which had been left exposed, and in some of the blue-bottle flies. These flies are commonly bred along the sides of esteros, which are dumping grounds for numberless privies, private sewers, and latrines. In certain places along the sides of these esteros where deposits have been accumulating for many generations great beds of wriggling maggots are noticeable. The numerous cases which have been observed along the banks of certain esteros may be accounted for by blood infection from blue-bottle flies. There is no doubt but that the ordinary household fly can also transfer the cholera spirillum from infected matter to food, as is the case with typhoid fever. The board of health inaugurated a crusade against flies by means of fly poison, and also destroyed a large number of maggots in the esteros.

TROPICAL DISEASES ENCOUNTERED IN THE PHILIPPINE ISLANDS.

It is generally believed that the term "tropical diseases" applies only to affections common to tropical countries. While there are a large number of serious diseases and conditions prevalent in the Philippines, there are few which do not exist in temperate climates as well. The cause of certain diseases prevalent in the Tropics may be ascribed to the ignorance of the inhabitants of the country and their violation or the ordinary sanitary laws. I feel quite sure that, did the same sanitary conditions exist in the Philippine Islands as exist in the southern part of the United States, the results in regard to health would be practically about the same. The splendid work performed by army surgeons in Cuba in the eradication of yellow fever, and in Porto Rico with smallpox, goes a long way in bearing out these statements. The prevalence of the serious diseases and conditions encountered here, then, may be considered as due to the disregard of sanitary measures and the filthy surroundings of the natives. The Filipino is a fatalist, and, like the Mexican, accepts the visitations of serious epidemics with serenity and resignation, believing them divine dispensations.

Apart from the epidemics of plague, cholera, and smallpox, the serious diseases here are dysentery and malarial infection, both of which are preventable. If we are correct in our views in regard to the etiological factors of these two diseases, then with care in the use of water, and mosquito netting, both conditions could practically be avoided. There can be but little doubt that the tropical sun plays an important rôle in the well-being of the body in the Philippine Islands, and the natives who have been accustomed to it for centuries very wisely keep away from its baleful effects during the midday hours through the enjoyment of their traditional siesta.

From a nonscientific but very practical point of view the tropical diseases of the Philippine Islands may be divided into two classes, the serious or fatal and the nonserious. The most prominent of the first class are the following: Bubonic plague, cholera, smallpox, specific and amæbic dysentery, beriberi, leprosy, consumption, pernicious malarial fever, and sprue. The second list includes typhoid fever, Malta fever, estivo-autumnal and malarial fevers, diarrhoea, intestinal parasites (including the round and tape worms and the larvæ of the bluebottle fly), dengue, and a number of parasitical skin affections, among which may be mentioned dhoby or washerman's itch and other forms of ringworm, leeches, prickly heat, and the general enervation from life in the Tropics referred to above.

The prominent diseases affecting domestic animals consist of surra, rinderpest, hog and chicken cholera.

Smallpox.—Smallpox has existed in the Philippine Islands from time immemorial, and was one of the most prominent causes of death among the Filipinos at the date of the American invasion. The disease is almost invariably found in the Tropics, especially among the Latin races, and is altogether due to ineffectual methods of vaccination or its absence altogether. For several reasons, very little attention has been paid to thorough vaccination in the Philippine Islands. In the first place, owing to the poor facilities for transportation, it has been almost impossible to send potent virus to the distant pueblos and islands in the archipelago; and, in the second place, the true spirit of thorough vaccination has never been carried out. At the beginning of the American invasion smallpox was very common in a most malignant form, not only in the city of Manila, but throughout the entire archipelago. As a result of careful vaccinations performed by the board of health and medical officers of the Army in the provinces during the past four years, the disease has almost entirely disappeared from the archipelago. About 10 per cent of the natives are immune from the disease by reason of previous attacks, and it is believed that more than 1,000,000 persons have been vaccinated since the occupancy of the islands by the Americans

Notwithstanding the antivaccination societies that have been formed in different parts of the world, it is a known scientific fact that unless this prophylactic measure is faithfully and scientifically carried out the dreaded scourge is bound to occur; while, on the other hand, no one who is thoroughly protected by proper vaccination need fear the disease.

On the recommendation of the board of health, a law providing for compulsory vaccination was passed by the civil commission during the past winter requiring everyone in the islands either to be vaccinated or to show a certificate of immunity.

The presidents of municipal boards of health are in this law designated as vaccinators, but owing to the impossibility of organizing municipal boards of health, until quite recently a large number of native vaccinators were employed throughout the entire archipelago for the purpose of making public vaccinations. These vaccinators were paid 30 pesos per month, and, as a rule, did their work in a very satisfactory manner.

A complete system of blanks and reports was furnished these vaccinators for the purpose of compiling statistics. The books are retained among the records in the tribunal of each pueblo, while the monthly reports are forwarded to the board of health for the Philippine Islands.

Specific and amœbic dysentery.—Three forms of dysentery are recognized in the Philippines—the acute sporadic, amœbic, and specific. The acute sporadic form of the disease is commonly encountered in the United States, and while the amœbic and specific are very bad at times, they are rare. Acute sporadic dysentery is supposed to result from congestion of the larger bowels, from various climatic causes, as well as from the ingestion of certain irritating articles of diet, while the amœbic and epidemic forms are due to specific germs. The amœbic form is supposed to be the result of amœbæ, which are found in the dejections of the patients, while the specific dysentery is supposed to result from the bacillus dysenteriæ, a germ discovered by Shiga, a Japanese investigator.

From careful studies it has been definitely determined that both the amœbic and epidemic forms of dysentery are contracted by the use of infected water or food, and it is believed that except through these agencies this disease will not occur.

The amœbic is the more common form of the two, and was frequently observed among the soldiers on duty in the Philippine Islands during the first two years of the Philippine insurrection. It was supposed to have been contracted by the use of infected water taken from village wells, swamps, bayous, and other places in the provinces while on "hikes."

Since amœbic dysentery frequently begins as a diarrhea, persons in the Tropics suffering from any intestinal disturbance should have the stools examined microscropically.

Both of these forms of dysentery may be regarded as preventable by the use of water which does not contain the specific microbe.

Abscesses of the liver are not infrequently associated with the amœbic form of dysentery.

Beriberi.—This prominent tropical disease is responsible for a considerable proportion of the mortality in the archipelago. Dr. Manson defines beriberi as a specific form of multiple peripheral neuritis occurring as an epidemic in most tropical and subtropical climates, and also under certain artificial conditions in more temperate latitudes. There are two forms, the wet and the dry. The symptoms of each are extremely numerous and diverse, often leading the neophyte of tropical medicine astray in pursuit of some striking complication.

The behavior of beriberi in the Philippine Islands confirms the general observations reported by physicians from all parts of the tropical world; that is, it is a disease of prisons and ships, of dampness and heat, of overcrowding and poverty. The entire crews of small native sailboats, subject to severe exposure during the rainy season, become infected and leave their dead at every port, until shortness of hands compels them to end their cruise. Few native prisons escape the disease, and many suffer severely. Bilibid is probably the largest and certainly one of the cleanest and most carefully conducted prisons in the Philippine Islands, and yet it suffered with over 2,000 cases during the winter of 1901. The prison surgeon, Dr. L. H. Fales, states that the diet is liberal in quantity and superior in quality. The rice is the best Ceylon, and there is a liberal allowance of Australian beef, vegetables, and fresh fish. None of the prisoners sleep on the floor, and half of them sleep on bamboo bunks, about 7 feet above the floor. Blinds were removed from the windows to admit the maximum amount of sunshine and air, and the wards were disinfected regularly. In spite of these measures Dr. Fales reported 2,470 cases, with 77 deaths, in Bilibid during the six months ending May 31, 1902. The total number of cases, however, is probably nearer 1,200, considering as recurrences the cases reported as having two or three distinct attacks.

It has not been observed here that season exercises any marked influence on the prevalence of the disease. Bubonic plague shows an unmistakable preference for the hot, dry months; but in looking over the available data for the past two years I find that beriberi seems to offer no preference for any season, though February, March, April, and May, the hot season, offer the largest number of reported cases. Of the total of 624 deaths reported to the board of health all occurred among natives and Chinese, a striking illustration of the comparative immunity of European races. Spanish mestizos are said to contract the disease much less frequently than the poor, ill-fed natives; but it must be remembered that the former class, as well as the Europeans, belong with very few exceptions to the more prosperous and better-fed portion of the community.

Our observations tend to sustain the view that the ætiological factor of beriberi resides outside of the food. The prison diets have been liberal and varied under American régime, and yet a large portion of the prisoners who contract the disease within the prison walls come from an exclusive home diet of rice and fish. Furthermore, the mere substitution of a nitrogenous for a rice diet has not in our experience improved the condition of a patient suffering from beriberi. Removal to new, dry, sunshiny quarters has been found to be the best means of effecting a cure, and if to this measure be added a liberal diet and a suitable tonic the great majority of cases recover with much promptness.

As the conditions of living improve among the natives and Chinese population, and the low, damp nipa shacks give way to the dry tenement house with living rooms high above the ground, it is safe to predict that the mortality from beriberi will be considerably reduced in the Philippine Islands.

The monthly deaths from beriberi during the year 1901 were as follows: February, 35; March, 59; April, 79; May, 60; June, 19; July, 13; August, 15; September, 22; October, 18; November, 39; December, 47.

Leprosy.—Leprosy is a disease common to all tropical countries, but is also found in temperate regions, and as far north as Norway, Sweden, and Iceland. The number of lepers living in the Philippine Islands at the time of the American occupancy has been variously estimated at from 15,000 to 30,000. These figures were given by the Friars and others, who were presumed to have understood the situation. From a census taken by the board of health during the past year it is believed that not over 5,000 lepers exist in the islands at present, and they appear to be uniformly scattered throughout the entire archipelago.

Leprosy is traditionally supposed to have been imported into the Philippine Islands from Japan about two hundred years ago. It is said that one of the Shogons, learning of the good work performed by the Friars in the Philippine Islands, decided to send a shipload of Japanese lepers to the Philippines for their care. This was done about 1662.

The affection is dependent upon a specific germ, the bacillus lepræ, but is practically no more contagious than consumption. It is very common to find leprous relatives who have lived for years with their families without imparting the disease to other members of the household. One native woman has lived among the lepers in the San Lazaro Hospital for twenty years as cook, and has given birth to a leprous son, who is now grown, without ever contracting the disease.

Pulmonary tuberculosis.—Pulmonary tuberculosis is very common among the native Filipinos and results in a large percentage of the mortality. During the month of April, 1902, over 106 persons succumbed to this disease alone in the city of Manila.

There is no difference between the character of the disease encountered in the Philippines and that noted in other parts of the globe. Persons affected, as a rule, belong to the poorer and lower classes, who live in wretched hovels and are poorly nourished. Few people who are well fed and live in proper habitations suffer from tuberculosis in the Philippine Islands. Besides pulmonary tuberculosis, occasionally the disease is found affecting the joints and other parts of the body.

Pernicious malarial fever.—Pernicious malarial fever at times appears in certain pueblos of the archipelago in the form of an endemic, and is always coincident with a sickly season of the year. The disease very promptly responds to sanitary measures, with the liberal use of quinine.

Sprue or psilosis.—Sprue is understood to be a persistent and dangerous form of catarrhal inflammation of the whole or part of the mucous membrane of the alimentary canal, and is generally associated with disturbances of the functions of the liver and other glandular organs connected with the digestive process. The disease is characterized by inflammation of the mucous membrane of the mouth, with mucous sores, flagellant dyspepsia, pale, copious, loose, frothy, and fomenting stools, wasting and anemia, and a tendency to relapse. The disease is frequently called tropical diarrhea, and the term "sprue" is an adaptation of the Dutch word "sprew," used in Java, where the disease is very common. The disease is not common in the Philippine Islands, and likewise not amenable to treatment in the Tropics. It is necessary for those affected with it to leave the country and go to a temperate climate.

Intermittent and estivo-autumnal fevers.—The ordinary types of malarial fever are found in the Philippine Islands, but are not generally common throughout the entire archipelago, nor more so than in certain parts of the United States. Large sections of land are very free from the malarial mosquito, and hence these sections are immune from the disease. The interior of the island of Mindoro and certain high plains lying between mountain ranges are apparently more infected with this disease than the table-lands along the seashore. The city of Manila is peculiarly free from malaria, and it is rarely necessary for its inhabitants to resort to the use of quinine as a malarial preventive. Investigations are being made by the board of health in regard to the location of the species of mosquito known to scientists as the "anapholes," the host of the malarial parasite, but so far the work has been limited, owing to the difficulty of collecting the insects for classification.

Intestinal worms.—Intestinal worms is a common affection among the inhabitants of the Philippine Islands, adults as well as children. The following varieties are commonly found in these islands among the natives: Ascaris lumbricoides, or the long, round form; Tænia solium and Tænia saginata; and the Oxyuris vermicularis, or the pin worm. During the recent insurrection a large number of troops serving in the Philippine Islands, both officers and men, were affected by the long, round worm as a result of drinking water from infected wells and the use of uncooked vegetables and salads. The ova of the pin worm are likewise taken into the system by drinking water or eating uncooked foods and vegetables. The Tænia solium is contracted by eating measly pork which contains the larvæ of the worm, or by drinking water containing the ova, while the Tænia saginata is commonly believed to be contracted by eating the flesh of cattle infected by the larvæ of the worm, a condition known as "beef measles."

Not infrequently the larvæ of the bluebottle fly are taken into the system and developed through the use of infected food. I believe that few children can be found in the provinces who are not affected with intestinal worms. The cause of this widespread condition results from the surface wells and the lack of care in disposing of fecal matter of animals which live in the yards with the occupants of the house.

Dhoby itch.—Generally speaking, all irritating and troublesome acute affections of the skin in the Tropics are termed "dhoby or washerman's itch." There are quite a number of skin affections belonging to the ringworm variety which are classed as dhoby itch, the principal ones of which are produced by a fungus known as the "Microsporon furfur," "Microsporon minutissimum," and the "Trichophyton."

The most general location of dhoby itch is in the crotch, or axillary space, although it may appear on any part of the body. The ringworm resulting from the Microsporon furfur and the Trichophyton is common among the natives in the Philippine Islands, and I have seen children among the Moros whose entire bodies were covered with the disease, the affection appearing almost like tattooing, so regular and perfect were the curves.

These parasitical diseases may be contracted by means of clothes infected in the laundries or by contact. The disease is amenable to a saturated solution of salicylic acid or a 10 per cent application of chrysophanic acid in vaseline.

Leeches.—Leeches are very common in certain parts of the Philippine Islands, and are found in the grass and jungles. Before feeding they are about 1 inch in length and the thickness of a knitting needle, and suspend themselves from twigs or blades of grass to wait for the passing of some animal on which to drop. With remarkable activity they at once attach themselves to the skin and proceed to make a meal on the blood. They have been known to settle themselves so thickly on certain animals as to cause their death by the abstraction of blood. Sometimes they enter the gullets, or nostrils, of man as well as animals. During "hikes" in Samar, in a number of instances our men were affected by these pests, the leech gaining access to the skin by working its way in between the shoe top and the legging.

Prickly heat.—Prickly heat or "lichen tropicus" is frequently observed in the Philippine Islands during the hot season, which begins about April 1 and terminates June 30. The affection here resembles in every way the prickly heat so commonly found in the United States during the summer months.

There is a common superstition among the natives in the Philippine Islands that the mango is productive of prickly heat but I believe this to be only a superstition and entirely unwarranted, resulting probably from the fact that the use of this fruit is coincident with the heated period.

Prickly heat is usually absent from July 1 to April 1 during the wet and temperate seasons of the year.

Diphtheria.—During the past two years (ending May 31, 1902) eight cases of diphtheria were reported in the Philippine Islands, two of which were confirmed by microscopical examinations made by a native physician. All of these cases have been fatal. In view of the very limited number of reported cases and the uncertainty of the trustworthiness of the bacteriological confirmation, one is justified in doubting the existence of the disease in these islands. It would seem that the conditions prevailing here during the early part of the cool season, when catarrhal inflammation of the respiratory tract prevailed so generally, would favor the rapid spread of diphtheria among the poorer classes if the specific organism had infected even one member of the community.

Cancer.—During the two years ending May 31, 1902, there were reported in Manila 28 deaths from cancer, the site of the disease being in the following order of frequency: Buccal cavity, skin, female genital organs, stomach, liver, mammary glands, rectum.

Scarletina.—Scarletina appears to be unknown in the Philippine Islands, as no recorded cases of this disease are to be found.

Yellow fever.—This disease is unknown in the Philippine Islands.

Insanity.—Insanity is not very frequently met with among the natives of the Philippine Islands, and, except the provisions made in the Hospicio de San José, in this city, for the care of this class of patients, there are no insane asylums in the entire archipelago. I have understood that, on account of the small number of cases occurring in the islands, they were either treated at home with the families or, if too violent, sent to the carcels in the various capitals of the provinces.

The following tables show the number of cases under treatment in the Hospicio de San José at the present time, with sex, nativity, and character of disease. A large number of these cases came from the provinces.

Nationality.

	Male.	Female.
Native	91	95
Europeans	17	4
Americans	3	0
Total	111	99

Character of disease.

	Male.	Female.
Mania:		
Religious	0	3
Aggressive	5	3
Furious	10	20
Persecution	6	0
Hallucinations	10	0
Dementia	30	33
Epilepsy	4	4
Chorea	1	0
Eratomania	0	3
General	45	30
Total	111	99

DISEASES OF ANIMALS.

Rinderpest.—During 1901 rinderpest prevailed almost universally throughout the islands. Certain localities escaped for a time, but in almost every case the infection was finally introduced and spread with great rapidity. The mortality was very high, amounting almost to the destruction of the entire herds of carabao and cattle. For example, in Marinduque the authorities reported 1,294 sick and 1,224 deaths between July and November, 1901, a mortality of nearly 95 per cent. The following table summarizes the reports from all the provinces that have responded to the request of the board for statistics in regard to rinderpest mortality. It is to be noticed that the number of deaths has been greatly underestimated, for many of the reports refer merely to the vicinity of the capital city, and returns from the interior of provinces are of necessity very unreliable. No report was received from Bohol, which was in a state of war, but it is well known that hundreds of animals succumbed to some epidemic disease there:

Province.	Date of outbreak.	Number of carabaos and cattle dead.
Antique	June 1	8,000
Bohol	October, 1901	
Union	January, February, and March	1,000
Ilocos Sur (Vigan)	do	1,200
Cagayan:		
Aparri	November, 1900	1,250
Lollac	January-August, 1901	940
Alcala	do	600
Tuguegaro	do	1,500
Isabela	do	7,059
Camarines Sur	July, August, September, October, 1900	13,070
Marinduque	July to November, 1901	1,221
Mindanao	October 8, 1901	
Total		35,840

In response to requests from the provinces for help in combating rinderpest, our representatives were sent to some of the most severely affected localities. The appended extracts from reports of our veterinary surgeons and Mr. H. C. Luersson, assistant director of the serum institute, describe at length the method used in fighting the disease and some of the difficulties encountered. Owing to the limited number of skilled inspectors available and the great number of animals afflicted, it was deemed wisest to confine ourselves to the use of the simple bile injections instead of attempting to produce a prophylactic serum. Native physicians and practicantes could be readily instructed in the technique of the form of procedure who would have found it impossible to conduct the preparation of serum. In this connection Dr. Hutcheon remarks, from observations in Cape Colony, that while he considers the serum injection more effective than the bile, they are much less capable of general use, and he is not surprised that the Cape farmers are resuming the use of the simpler bile injection. The latest reports of experiments in various parts of the world (South Africa, Russia, Turkey, etc.) indicate pretty strongly that the most powerful and lasting immunity is gained by the injection of a small dose (about two-tenths of 1 c. c.) of virulent pest blood, followed in an hour or two by an injection of strong serum. By this method Kolle and Turner claim to have reduced the mortality in cattle from 90 or 95 per cent to 13.9 per cent, and rank the serum with Bering's antitoxine serum in efficiency. Marked curative action is also ascribed to this serum. The serum institute is working with these problems, and the method of immunization and cure found to be the most effective will be gradually introduced at the most important stations throughout the islands, where men trained in laboratory technique can supervise the injection and distribution of the immunizing products. Of necessity this will require considerable time, and in the meanwhile bile injections will be carried on in the localities where the rinderpest may reoccur. At the present date the virulency of rinderpest has evidently abated, as no cases are being reported.

According to the reports of our inspectors, about 3,000 bile injections were made under their supervision, with fairly satisfactory results as to immunization, although unfortunately there was no time for careful observation for a sufficiently long time in any one locality.

The local effect of the injection is slight and the general symptoms mild or absent. In localities where the injections were known to have been carefully given, the more intelligent natives, especially cattle owners, were satisfied as to the beneficial effect. On the other hand, the ignorant natives were often distrustful, and by their lack of cooperation added greatly to the difficulties of the work and impeded its success. The following circulars, issued by the board of health on March 12 and April 19, 1901, describe the symptoms of the disease, preventive measures, and methods of collecting and preparing bile for injection.

"[Circular letter No. 4.]

"OFFICE OF THE BOARD OF HEALTH,
"*Manila, P. I., March 12, 1901.*

"CATTLE PLAGUE.

"Rinderpest or cattle plague is one of the most fatal of the infectious or contagious diseases affecting cattle, sheep, hogs, or carabao. The mortality is very high, oftentimes exterminating entire herds. This dread disease has made its appearance in many parts of the Philippine Islands, spreading from province to province and island to island, and will eventually destroy the cattle industry of the entire country if proper measures are not taken to prevent its spread and eliminate it from the districts where it has gained a lodgment. This can be done by carrying out strictly the subjoined rules.

"The disease is characterized by loss of appetite, drooping of the head, general dejected appearance, usually a watery discharge from the eyes and nostrils, followed by a watery diarrhea, which later becomes bloody. Death occurs in from twenty-four to forty-eight hours after the first symptoms are noticed. There is no other disease affecting cattle with like symptoms.

"The discharge from the eyes and nose and the diarrheal stools contain the disease-producing matter. This infectious matter may be carried by the wind, dogs, hands, feet, or clothing of attendants, and by all mechanical appliances used in herding cattle. The pastures also become infected and cattle grazing in them will contract the disease.

"PREVENTIVE MEASURES.

"1. All cattle on the appearance of the first symptoms must be isolated from the herd and destroyed as soon as it is determined that the disease is plague.

"2. The bodies of cattle dead of the disease should be burned on the spot. In no case attempt to save the hide, as the disease is often transmitted long distances in shipments of hides.

"3. After the appearance of the disease the entire herd must be inspected daily and all sick cattle removed and isolated.

"4. The infected herd should not be moved into new pastures, as it is best to infect as little ground as possible.

"5. Infected herds must not under any circumstances be driven from one section to another, nor must they be watered at a running stream. If necessary, dig a well to supply water during an epidemic.

"6. Attendants caring for infected herds must not go into the pastures or visit the attendants of neighboring herds.

"7. Attendants should disinfect themselves and their clothing as carefully as if they were handling an infectious disease amongst persons. This is done by washing hands and clothing in 5 per cent solution of carbolic acid or 1 to 1,000 solution of corrosive sublimate; in case of clothing, where contaminated with infectious matter from the nostrils of the animals, boiling in water for fifteen minutes is sufficient.

"8. The infected pasture should be closely fenced to prevent animals grazing over the infected area. No cattle should be allowed in an infected pasture for at least two years, unless its surface should be burned over and plowed under.

"9. The fences which have inclosed infected cattle must be washed with one of the disinfecting solutions.

"10. Immunization of the herd by injecting 10 c.c. of the gall taken from pest animal into the belly wall of healthy animals. The gall is removed from the animal immediately after death and kept in a cool place for three days before using.

"This process will not cure animals already sick, but will shorten the epidemic."

"[Circular letter No. 6.]

"MUNICIPAL LABORATORY,
"OFFICE OF THE BOARD OF HEALTH,
"*Manila, P. I., April 19, 1901.*

"RINDERPEST.

"The importance of this disease to the welfare of the Philippines renders imperative the publication of knowledge gained from most recent investigations. This circular should be considered a supplement to circular letter 4, March 12, 1901, office of the board of health, Manila, P. I., on the same subject, and is distributed because of additional information acquired during the recent epidemic of rinderpest near Manila. The period of incubation of this pest is short, varying from three or four to eight days. It is necessary that cattle owners recognize the disease very early in order to take steps to prevent its spread. Fever is the first symptom observed. Nothing else wrong may be noticed for two or three days, then the symptoms as noted in the above-mentioned circular become prominent; in addition, great prostration with evident intense suffering of animals from abdominal pain is characteristic. Later in the disease the watery discharge from eyes and nose becomes purulent, frequently occluding the nares. The duration of the pest from the first symptom to death is two to five or six days.

"No other disease affecting cattle can be mistaken for rinderpest, as will be seen by a recapitulation of its symptoms—loss of appetite; high fever; inflammation of conjunctivæ; profuse water discharge from eyes and nose, finally becoming purulent; diarrhea, often bloody; great prostration and apparently intense abdominal pain; high mortality. The symptoms are practically given in the order of their occurrence, although the diarrhea may occur very early.

"The following methods of procedure will check the spreading of the disease in a community, but offers little encouragement for the treatment of animals already sick:

"1. Remove the gall bladder of an animal dead of rinderpest, taking as little of the liver substance as possible; wash the bladder in a 2 per cent carbolic-acid solution, then several times in water which has been boiled and allowed to cool. Now draw off the gall through the gall duct by a puncture through the gall bladder. A bottle boiled and allowed to cool should be used for this gall, which must be mixed with glycerin in the proportion of 1 to 3. The gall and glycerin should be kept in a cool place for four days, after which period it may be used. The mixture will keep for months. Care must be taken not to use any bile of a decided yellow color.

"2. Clean and disinfect in a 5 per cent carbolic-acid solution the syringe for injecting the fluid. Leave syringe in carbolic acid for ten minutes; then rinse in boiled water several times in order to remove the carbolic acid; wash the hide of the animal at the point of inoculation with water and soap, then with a 5 per cent solution of carbolic acid; inject 25 c. c. beneath the skin of the belly wall of all the animals of the herd; reinject in from eight to ten days after first injection.

"3. Treat herd as directed in circular letter 4, office of the board of health, Manila, P. I., March 12, 1901."

Act No. 262, providing for the interment or burning of the bodies of animals which have died of rinderpest and prohibiting the sale or use of any part thereof, is also inserted.

No. 262.—An act providing for the interment or burning of the bodies of animals which die having rinderpest, and prohibiting the sale or use of any part thereof.

"*By authority of the President of the United States, be it enacted by the United States Philippine Commission*, That—

"SECTION 1. The owners of animals which die having rinderpest shall, where practicable, cause their bodies to be burned and shall inter any unconsumed portions remaining. Where it is impracticable to burn such bodies, they shall cause them to be interred at a depth of at least one meter below the surface of the ground and thoroughly covered with earth.

"SEC. 2. It shall be unlawful to remove the skin, horns, or any part of the body of an animal which dies having rinderpest, except the bile or blood serum for use in immunizing other animals against the disease.

"SEC. 3. It shall be unlawful for any person knowingly to have in his possession, or knowingly to sell, offer for sale, or export the skin, horns, or any other part of an animal which has died having rinderpest, except the bile or blood serum; and all persons having in their possession skins, horns, or other portions of such animals at the time of the passage of this act shall destroy them by burning or shall inter them. Officers of the law are hereby authorized to seize and destroy such skins, horns, or other portions of the body of any animal which has died having rinderpest whereever found.

"SEC. 4. A violation of any of the provisions of this act shall be a misdemeanor, punishable by a fine of not to exceed fifty dollars ($50), United States currency, or by imprisonment for not more than thirty (30) days, or both, in the discretion of the court.

"SEC. 5. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with Section 2 of 'An act prescribing the order of procedure by the Commission in the enactment of laws,' passed September 26, 1900.

"SEC. 6. This act shall take effect on its passage.

"Enacted October 11, 1901."

Surra.—Reports from many provinces, provincial governors, and from health officers sent to investigate and treat rinderpest indicate the widespread existence of this very fatal epidemic among horses. Owing to the fact that very few provincial boards of health were in operation at the height of the epidemic, only a few exact statistics were received. Marinduque reports 50 horses attacked and 41 dead between July and August, 1901. The province of Isabela reports 783 horses lost from January to August, 1901. These figures doubtless fall far short of the true estimate, and the losses suffered throughout the archipelago must be counted by the thousands. Figures have not been received from Ambos Camarines, Batangas, and other sections which are known to have suffered very extensively.

Surra is a parasitical disease well known in Burmah, India, and Java, and is closely related to the nagana or tsetse fly disease of Africa. It is caused by the presence in the blood of a microscopic parasite, the Trypanosoma evansi, about three times the diameter of a red-blood corpuscle in length and resembling a whipworm. The blood of a sick animal contains these parasites in enormous numbers. The infection is carried by suctorial insects.

Dr. J. J. Curry, in a recent report to the Surgeon-General of the Army, dated December 16, 1901, states that he has found large numbers of active trypanosoma in the bodies of living flies found on infected animals. He also found the parasite swarming in the blood of dead carabaos that had been grazing in a pasture known to be infected. This coincides with the behavior of the nagana in Africa, which affects cattle as well as horses, though not with such fatal results, according to most reports. Dogs and cats are also susceptible to the nagana and possibly may help to spread the disease.

In a report of Dr. J. G. Slee, assistant veterinarian of the board of health, mention is made of the fact that the surra epidemic among ponies in Albay and the Camarines followed close upon the plague of carabao and cattle. The same conditions have been reported from many parts of the archipelago, and, in view of Dr. Curry's discovery of the parasite in carabaos, it is a question of great interest whether a great part of the mortality may not have been due to surra in spite of rinderpest. This matter will be investigated by the department whenever circumstances permit.

The symptoms are remittent fever, anæmia, progressive emaciation, œdema of the abdominal walls and legs, submaxillary adenitis, progressing to suppuration, and chronic discharge suggestive of glanders.

Dr. A. M. Smith, U. S. Army, in a report to the adjutant-general, Division of the Philippines, calls attention to the latter fact, and states that this occasional resemblance to glanders is frequently increased by the existence of a mucopurulent discharge from the nose of the infected animal.

Treatment of the disease has been unsatisfactory. Iron, quinine, and Fowler's solution have been used.

Hog cholera.—Twenty-five cases of hog cholera have been detected in Manila, in the Matadero, since March 1, 1902, but it has been impossible thus far to ascertain the locality from which individual hogs affected were shipped. The early diagnoses were confirmed by bacteriological examinations at the laboratory. All cases were cremated in the Matadero crematory. Great numbers of hogs died in the provinces during the height of the rinderpest epidemic, and the natives consider the ætiology identical in the two classes of animals. It is an interesting and suggestive fact that the hog cholera abated and disappeared coincidentally with the Asiatic cholera in a town which was thoroughly cleaned up by the health authorities in combating the latter disease.

Chicken cholera.—Chicken cholera has been reported unofficially from many parts of the archipelago, but in view of the prevalence of more serious scourges of both man and beast has as yet received practically no investigation. As in the case of hog cholera, it is worthy of note that chicken cholera has prevailed at the same time that the former and rinderpest prevailed, and that in one notable case it yielded to simple measures of municipal cleanliness.

Epizootic lymphangitis, African farcy, Neapolitan farcy, river farcy, benign farcy, farcirous lymphangitis, African lymphangitis.—Dr. J. G. Slee, assistant city veterinarian, board of health, submits the following remarks in a report in regard to these diseases:

"Epizootic lymphangitis is a specific, parasitic, contagious lymphangitis, due to the Cryptococcus farciminosus of Revolta.

"It is particularly interesting to us in the archipelago, as it presents so many of the characteristics of farcy (glanders), and is undoubtedly mistaken by the layman or those in care of stock for that condition. Friedberger and Frohner say that it 'is always consecutive to a traumatism, and takes place after an incubation of about three months. It is marked by multiple abscesses, which are developed in the skin and the subcutaneous connective tissue, in the neighborhood of the inoculating wound. These abscesses are soon accompanied by a superficial or deep lymphangitis, which ends in suppuration. Its mortality is about 11 per cent.'

"Epizootic lymphangitis and glanders may evolve simultaneously in the same animal. [Peupion and Boinet.]

"Among our horses and mules, and also the native pony, the first lesions to appear are the corded appearance of the lymphatics, and are confined to no particular part, but may develop on the neck, shoulders, or body and legs. There is not the pain and heat of lymphangitis or the marked regularity of farcy. The papules are elevated, and upon rupture or being opened discharge a yellowish pus.

"If the disease is due to inoculation, that is probably the reason the abscesses develop in so many different locations.

"The period of inoculation is probably much shorter than three months, as the only case that I could in any manner be certain of developed in less than three weeks after being exposed.

"Nocard finds in an enlargement of 400 to 500 diameters the parasite appears as a large ovoid micrococcus with borders, having a high index of refraction, He also finds in "white scour" of calves a micrococcus, which is similar to the coccus found in the abscesses of pseudo-farcinous lymphangitis, but epizootic lymphangitis has not been noticed in the cattle or carabao of the islands.

"In all cases verification of the condition should be made, as in many animals it is difficult to make a differential diagnosis between farcy and epizootic lymphangitis. The abscesses have not the same deep, ragged appearance of farcy, and respond to treatment more rapidly. As they appear they should be opened and the contents evacuated and properly dressed. Although this condition has been noticed in the provinces for a long time, during both the wet and dry seasons, very few cases have appeared in Manila, and of these the researches made in the laboratory demonstrate that the disease is not farcy, but that it is due to a fungus (blastomycites). The disease represents the same clinical characteristics described as epizootic lymphangitis, and we will have to await further developments to decide if the organism is the same as noted by others."

PROVINCIAL BOARDS OF HEALTH.

On the recommendation of the board of health for the Philippine Islands the Commission passed act No. 307, authorizing the establishment of provincial boards of health.

The personnel of provincial boards of health consists of a president, who is required to be a graduate of medicine; the president of the municipal board of health of the capital of the province, and the provincial supervisor. The provincial secretary acts as the secretary for the provincial board of health in addition to his other duties. In my opinion, however, the duties of secretary of provincial board of health can not be satisfactorily performed by the secretary of the province, and the law should be so modified as to allow a secretary especially for the provincial board of health.

Provincial boards of health were directed to take charge of the sanitary affairs of the province under the insular board, and were furnished with the following instructions:

"DUTIES OF THE PRESIDENTS OF THE PROVINCIAL BOARDS OF HEALTH.

"1. The president of the provincial board of health shall be the executive head of same, and shall have control and supervision of the various branches of his administration.

"Presidents shall prepare quarterly estimates of the funds necessary for the execution of the plans of the board during the above-mentioned period, and shall submit same to the provincial board at least thirty days before the beginning of the quarter.

"They shall forward to the board of health of the Philippine Islands, according to instructions, daily, weekly, and monthly reports, and on or before the 30th of June of each year an annual report of the work executed in the province. This report shall include the general sanitary condition of the province and the work performed by the provincial board during the twelve months preceding. It shall also include a statement of all receipts and expenditures of the board.

"2. They shall also investigate the causes of all endemic diseases, and all contagious epidemics in the province. Diseases of animals shall be similarly investigated. Whenever immediate action may be necessary, and it be impossible to secure a meeting of the board, the necessary measures may be taken, and same shall be reported for the ratification of the board at its next meeting.

"They shall further see that the municipal boards of health properly fulfill their duties. They shall inspect all schools, hospitals, asylums, and other institutions in the province, and shall establish local and provincial quarantines whenever there exist contagious diseases and quarantine be necessary. Under instructions from the board of health for the Philippine Islands they shall have charge of all hospitals for infectious and contagious diseases within the province. They shall give instructions for the care of persons suffering from such diseases and for their proper isolation until all danger of the propagation of the disease is passed.

"3. They shall see that rules and ordinances regulating the sale of foods and drinks be observed in the various municipalities of the province.

"4. They shall see that animals suffering from glanders, surra, mange, epizooty, and other infectious and contagious diseases be isolated or destroyed, and remains of same properly disposed of.

"5. They shall see that all branches of trade within the province that are harmful and injurious be properly inspected and supervised.

"6. They shall see that burial permits are issued before interment, and that all births are properly registered.

"7. They shall see that all ordinances relative to the disposition of garbage, excreta, and waste matter be duly executed in the various towns of the province. They shall also see that closets, cesspools, etc., are properly cared for, and that the carcasses of dead animals and other decaying matter be duly disposed of.

"8. They shall also see that the houses of all persons suffering from infectious or contagious diseases are properly quarantined, and that placards indicating the nature of the disease be placed on same.

"9. They shall see that the board of health for the Philippine Islands be notified on the proper forms of all cases of leprosy in the provinces.

"10. They shall see that the provisions of act No. 309, relating to compulsory vaccinations, are duly fulfilled, and the proper forms forwarded to the board of health for the Philippine Islands.

"11. They shall see that notices of regular and special meetings of the provincial board of health be forwarded to the members in due time. Presidents shall have authority to call special meetings whenever necessary.

"12. They shall make a full report of the health of the province, and shall forward to the municipal boards and to the people instructions for the prevention of the propagation of contagious and infectious diseases.

"13. They shall see that all doctors, surgeons, dentists, veterinarians, druggists, pharmacists, midwives, embalmers, and undertakers who are pursuing their professions in the province are duly licensed, registered, and inscribed in the records of the provincial office.

"14. From time to time they shall make investigations of the work of the various municipal boards of health in their province, the particular duties of each member, etc., and shall make report of same whenever considered necessary."

"DUTIES OF THE PROVINCIAL BOARD OF HEALTH.

"1. The provincial board of health shall have authority to submit resolutions for the prevention and suppression of contagious and infectious diseases of men and of animals; for the destruction of obstacles to the public health; for the enforcement of quarantine, whenever necessary, in places where there are no local board of health authorities, and in places where same exist, but sanitary regulations are not enforced.

"2. It shall have the right to demand reports and information regarding any subject essential to the proper discharge of the duties of the provincial board from public drug stores, asylums, hospitals, houses of correction, prisons, penitentiaries, schools, etc., and from the regents, superintendents, superiors, wardens, and other functionaries of same, and from all other public institutions, and from their regents and superiors; from landlords, agents, and tenants of all places of public amusement in the province, and also from all persons engaged in the business of transportation.

"3. It shall have authority to enforce all rules and regulations relating to vaccination and to inoculation with prophylactic serum, and shall prepare reports of same for the board of health for the Philippine Islands.

"4. It shall have authority to destroy the cause of any particular disease, or to improve the sanitary condition of pueblos, districts, or barrios; to destroy obstacles to public health, and to enforce, for the suppression of contagious diseases of man or of animals, all legal rules and regulations, provided that they have become laws by disposition of the civil commission or are in force as rules and regulations of the board of health for the Philippine Islands.

"5. It shall have power to appoint, with the approbation of the provincial board, one or more sanitary inspectors during epidemics of infectious or contagious diseases, whenever the people or animals of the province are suffering from same.

"6. It shall have authority to compel municipal boards of health to keep an exact record of marriages, births, deaths, burials, and exhumations in their respective pueblos, and provincial board shall forward copy of same to the board of health for the Philippine Islands when demanded.

"7. It shall carry a set of books containing all letters dispatched or received, and further complete statements regarding the necessary steps for the proper disposition of the business of the office.

"8. It shall not make contracts, nor incur any responsibility in excess of the funds voted for that purpose by the provincial board or by the central legislative authority of the islands.

The following is a list of the provinces in which provincial boards of health have been established, with the names of the presidents, dates of appointment, and salaries:

Province.	President board of health.	Appointed.	Salary.
Albay	Augustin Scarella	Jan. 10, 1902	$1,350
Antique	Donato Montinola	Apr. 21, 1902	[a]1,200
Bataan	Margarito de Castro	Jan. 10, 1902	900
Batangas	Jose Loysada	July 2, 1902	1,350
Bohol	D. Vicente Villafranca	Jan. 21, 1902	1,200
Bulacan	Felix Bautista	Jan. 10, 1902	1,350
Cagayan	Fernando Ricerra	Mar. 19, 1902	1,200
Camarines	Shannon Richmond	Mar. 25, 1902	1,350
Capiz	Paulino Quisumbing	Jan. 21, 1902	1,200
Cavite	Mariano Felizardo	July 7, 1902	1,200
Cebu	Jose Mascunana	Jan. 10, 1902	1,500
Ilocos Norte	Jose Puruganan	do	1,350
Ilocos Sur	Victoriano Crisologo	do	1,350
Iloilo	Pablo Araneta	do	1,500
Isabela	——— Visintuan		1,200
Laguna	Telesforo Ejercito	July 7, 1902	1,200
Leyte	Domingo Santos	Jan. 10, 1902	1,350

[a] Paid from insular funds.

Province.	President board of health.	Appointed.	Salary.
Masbate	Gabino Vinluan	Jan. 21, 1902	$900
Misamis	Francisco Xavier	June 23, 1902	1,200
Negros East	W. W. Langheim	Jan. 10, 1902	1,350
Negros West	Mariano Yulo	do	1,350
Nueva Ecija	Justo Panis	do	1,200
Pampanga	C. F. De Mey	May 12, 1902	1,350
Pangasinan	John T. H. Slayter	Jan. 10, 1902	1,350
Rizal	Sixto Angeles	do	1,200
Romblon	Sebastian de Castro	Jan. 21, 1902	900
Sorsogon	Julio Ruiz	Jan. 10, 1902	1,200
Surigao	Antonio Fernando	Feb. 13, 1902	[a]1,200
Tarlac	Andres Catanjal	July 9, 1902	1,200
Tayabas	Vicente de Jesus	Jan. 21, 1902	1,200
Union	Luis Caballero	Jan. 10, 1902	1,200
Zambales	Adquilino Calvo	July 7, 1902	1,200

[a] Paid from insular funds.

Except in three provinces, where American physicians have been appointed as presidents of provincial boards of health, this office has been filled by native physicians.

Owing to the fact that only a few months have elapsed since the organization of these boards, very little work has been done by them, and at this date it is impossible to give an intelligent opinion as to their effectiveness. It is believed by me, however, that very few Filipino physicians are acquainted with modern state medicine, and that they will not be capable of handling health matters until they have had more training.

Municipal Boards of Health.

On the recommendation of the board of health for the Philippine Islands the Commission passed act No. 308, authorizing the organization of municipal boards of health.

The personnel of municipal boards of health consists of a president, who is required to be either a physician or an undergraduate of medicine, a member of the municipal board, and a male school teacher of the municipality as active members, and the senior medical officer of the Army or Navy, if one be present in the pueblo, and a pharmacist as honorary members. The secretary of the municipal board, in addition to his other work, is required by law to act as secretary for the local board of health.

In a number of pueblos boards have organized and passed resolutions which have been enacted as town ordinances.

While the Filipino has never been taught to observe sanitary laws to any great extent, it is believed that with proper instruction municipal boards will be productive of great good.

The sanitary condition of provincial pueblos as a rule is wretched. The water supply usually consists of shallow wells, which are located in the rear of dwellings, and in many instances are unwalled, and are practically little more than holes in the ground. As a result the water in the most of these wells is contaminated from filth and fecal accumulations and not infrequently contains the bacilli of specific and amœbic dysentery, as well as the ova of certain parasites which have been washed into the wells during the frequent rains.

Very little attention has been paid to the disposition of night soil or garbage. As a rule each nipa shack is provided with an elevated water-closet, and the fecal matter allowed to drop on the ground, to be disposed of by hogs, which are used as scavengers in the country districts; to desiccate in the atmosphere, or to be washed away by the rains.

The garbage, also, as a rule is thrown out in a heap in the back yard, and it is little wonder that the mortality in the provinces is no greater than it is.

The Philippines as a Place of Residence for Americans and Europeans.

The climate of the Philippines is pleasant, equable, and healthful, and it is doubtful whether any other country in the world is more favored in this respect. At the level of the sea throughout the entire archipelago the mercury rarely goes below 60° or above 90° F. during the entire year. The mean maximum temperature for each month during the period beginning January 1, 1885, and ending December 31, 1898, was as follows: January, 85.6; February, 87.3; March, 89.9; April, 92.5; May, 91.9;

June, 89.8; July, 87.5; August, 87.1; September, 86.9; October, 87.8; November, 86.3; December, 85.3, with a general mean maximum for the twelve months during the fourteen years of 88.1. The monthly mean for the same period was as follows: January, 69.3; February, 69.1; March, 71.6; April, 73.9; May, 75.7; June, 75.6; July, 75.2; August, 75.2; September, 75.2; October, 75.3; November, 72.7; December, 70.9, with a general mean minimum of 73.2. From the middle of November until the middle of March the temperature in Manila is delightful, and from that time on until the latter part of June it is hot during the middle of the day, but considerably less so than in many of the Southern States in the summer, and cool compared to the Texas border, along the Rio Grande, at the same season. From July to November, during the rainy season, the temperature is very little higher than during the winter months, which is due to the frequent rains and clouded condition of the sky. Many people who have lived here several years prefer the rainy season to any other portion of the year. During the early years of American occupancy, when campaigns and severe "hikes" were daily occurrences, our troops suffered severely from intestinal and malarial affections, which could have been prevented had they been properly equipped and looked after. Neither officers nor men understood how to take care of themselves, and constantly drank from polluted wells and exposed themselves unnecessarily to the rays of a tropical sun. Partly as a result of the large amount of sickness which occurred among our troops, and partly from grossly misleading and exaggerated reports sent to newspapers and friends in the United States by hysterical men and women, the climate of the Philippines has been so unfairly misrepresented that many Americans have been dissuaded from coming here on that account. As a rule, all newcomers to the Tropics, especially those accustomed to a vigorous and bracing climate, lose flesh, vitality, and energy during acclimatization. This is even true with people living in the northern portion of the United States who settle in Texas or other portions of the South. The acclimatizing process in the Tropics usually requires from two to three years, and at the end of that period, provided the climate agrees with one, both flesh and health return. It should be borne in mind that certain people can no more become adapted to a tropical climate than others can to a rigorous one. While no arbitrary rule can be fixed as to the time one should remain in the Tropics after the first visit, the period should be limited to three or four years, even though nothing has occurred to disturb the general health during that time. English business houses in the Orient, and especially those in the Tropics, give their employees a year's leave of absence on full pay after five years of service. The Philippine Islands extend from the fifth degree of latitude to the twentieth degree, a distance of about 1,100 miles, and it is a notable fact that there are no noteworthy differences in temperature in any portion of the archipelago at the level of the sea. The table-lands surrounding Lake Lanao in the island of Mindanao lie at an altitude of about 2,500 feet, and are spoken of very highly as a delightfully cool and healthful climate. The Americans have had little experience, however, with this section of the archipelago, as until recently it remained a terra incognita. The physical features of the Philippines are mountains, plains, valleys, rivers, and lakes, and owing to the character of vegetation and foliage, the islands present a picture of eternal spring. The mountain districts in Luzon, Mindanao, Samar, and others of the larger islands are extensive, and in many cases occupied by distinct races, who never leave their mountain homes. The territory occupied by these people is not infrequently at an altitude of from 4,000 to 5,000 feet above the sea. As altitude overcomes latitude, it is more than probable that in the future health resorts will be established in the Philippine mountain regions, where a cool and invigorating climate can be enjoyed and tropical enervation more or less avoided without leaving the borders of the archipelago. Indeed, the problem of maintaining a good standard of health among the American families compelled to live for long continuous periods of time in these islands seems very near solution in the establishment of sanatoria in the high table-lands and forest-covered mountain regions. The civil government is just completing a sanatarium at Baguio, province of Benguet, capable of housing sixty patients, and cottages are planned for separate families. So soon as the government wagon road from Pozorrubio to Baguio is finished, transportation will be easy and the latter part of the trip a delightful one, passing through really magnificent mountain scenery. Baguio is located about 4,600 feet above sea level, and in the midst of a pine forest extending many miles in all directions. The only other tree at all common in the immediate region is the tree fern, a strange and beautiful companion for the pine. On the mountains of 5,500 to 6,000 feet, the oak grows, a fact that always has to be substantiated by a personal visit or a handful of acorns as proof. In Baguio a grate fire is almost a necessity during the rainy and cool season, especially in the evening, and one needs his blanket at night during the entire year. It is not expected that all tropical diseases will yield to the invigorating effects of such a climate, but to the civilian employee, dyspeptic and anemic, and enervated by hard work in the low land, it will supply the ozone and the brace so indispensable to the white races living in the tropics.

MINERAL SPRINGS.

The best known medicinal mineral waters in the Philippine Islands that have been analyzed are those at Sibul, province of Bulacan; Aguas Santos, at Los Baños, province of Laguna; Galas, Laguna; Boac, Marinduque; Tivi, Albay. There are many others but little known or worthless scattered over Luzon, Mindanao, and the Visayas—for example, the waters of the little spring of Mariquina, Manila; of the bongbongan spring in Pagsanjan, Laguna; the dilain, of Novaliches, and many more.

The waters of Los Baños, the analysis of which we have before us, are thermal, their temperature carrying at the different springs as follows:

	° C.		° C.
Spring A	91	Spring D	38
Spring B	63	Spring E	74
Spring C	49	Spring F	41

The sanatoria in the vicinity of Manila most recommended by the physicians of the capital are San Juan del Monte, Caloocan, and the little town of Mariveles, on the seacoast. The city district of Ermita was, and still is, a favorite point for local physicians to send their patients to convalesce from certain stubborn fevers defying medical treatment, and, indeed, the results seem to justify their course, whether it be the beneficent effect of the sea breezes or the effect on the minds of the patients of a change of locality, or both effects. The fact is that stubborn cases frequently yield. Santa Mesa has also been a favorite locality with many of the Manila faculty.

Very respectfully,

L. M. MAUS,
Lieutenant-Colonel and Deputy Surgeon-General, U. S. Army,
Commissioner of Public Health.

EXHIBIT A.

REPORT ON ASIATIC CHOLERA FROM THE SANTA MESA CHOLERA HOSPITAL.

By THOMAS R. MARSHALL, A. M., M. D., Captain and Assistant Surgeon, U. S. Volunteers.

MANILA, P. I., *May 20, 1902.*

The COMMISSIONER OF PUBLIC HEALTH,
Philippine Islands and City of Manila.

SIR: In compliance with your letter of April 25, 1902, embodying a letter from the honorable Secretary of the Interior of equal date, I submitted on May 1 a report on Asiatic cholera, as treated at the Santa Mesa Cholera Hospital, to April 30, inclusive.

This report was necessarily incomplete, in view of the fact that 45 cholera cases were then remaining under treatment and others were admitted after that date.

The discontinuance of this hospital on May 11, and the removal of the convalescents, to the San Lazaro Cholera Hospital, of which, also, I assumed charge, enables me now to complete the record of all cases transferred to the Santa Mesa Cholera Hospital from the date of its establishment, April 12, to the date of its discontinuance, May 11.

My report, submitted on May 1, embraces 181 individual case records, which is now supplemented by 5 additional cases, making a total of 186 cases recorded during the entire existence of the hospital.

The termination, in death or recovery, of the 45 cases remaining under treatment May 1 and of the 5 additional cases admitted after that date necessarily changes the summaries and percentages as submitted at that time.

In order to make this report complete within itself, much of the material considered at some length in my former report will be included, however, changing the percentages and summaries to suit the numerical increase and the final terminations.

SYMPTOMATOLOGY.

History of the premonitory diarrhea has been obtained in 50 per cent of cases; however, other prodromata, such as malaise, langour, depression of spirits, noises in the ears, etc., have been obtained in only 10 per cent of cases.

Rice-water stools, vomiting, suppression of the urine and bile, shrinking of the soft parts, fallen cheeks, pinched nose, sunken eyes, shriveled fingers, cold body surface, bedewed with a clamy sweat; respiration rapid and shallow, thready, weak and rapid pulse, voice sunken to a whisper, or entirely lost, and subnormal temperature, has been the usual run of symptoms. Few cases admitted to the hospital have complained of agonizing cramps in the extremities and abdomen, however these latter symptoms have been well marked in cases seen by the writer, shortly after the first symptoms appeared, and before removal to hospital.

TREATMENT.

Benzoyl-acetyl peroxide (*benzozone*).—Benzozone has been administered as a germicide, in all cases, when practicable, as appears from the records; this drug, in doses from 0.065 to 0.32 c. c., though administered in double capsules, is a gastric irritant, produces almost invariably retching and frequently vomiting.[a] When the capsule is ruptured by the teeth in the act of administration (which frequently occurred with natives and Chinese) it was observed that the drug produced excoriation within the mouth, and of the tongue, gums, and lips, so that nourishment by mouth was seriously interfered with, necessitating nutrient enemas and a discontinuance of the drug; this appears to be, however, a fault of administration only.

It appears, also, that formerly this drug was administered in solution (1:1,000) by mouth and rectal injections, but was discontinued by mouth by reason of gastric intolerance; however, by rectal injections beneficial results were claimed.

Normal salt solution.—The injection of 237 c. c. of normal salt solution with 30 c. c. brandy into the lower bowel of all adult cases on admission, and a proportionate quantity for children, has proven stimulating and advantageous.

Saline transfusion.—The transfusion of normal salt solution into the larger veins in from 30 to 59 c. c. has been resorted to in a number of cases, and in collapse it has given the most gratifying results; it is believed that this is an advantageous and well-warranted procedure.

Cardiac stimulants.—The use of strychnine hypodermically has proven more advantageous and responsive than digitalis, nitroglycerin, or spirits frumenti; however, these were used as the individual case suggested.

Sedatives and astringents.—Of the various drugs used with this view opium, caffeine, chlorodyne, and brandy have given the best results.

Diet.—Concentrated liquid nourishment only can be employed, and this in quantities from 30 to 188 c. c., as indicated by gastric toleration, frequently repeated. For this purpose milk, milk punch, eggnog, soft-boiled eggs, wine and beef extract have been best retained; however, gastric intolerance is a common symptom and rectal enemas have been resorted to in all such cases. The diet of convalescence is confined to liquids, shaped in appetizing forms, until a gradual return to heavier diet is warranted.

MORTALITY.

As appears from the records, the total mortality has been 82.16 per cent. However, of this 4.33 per cent died en route to hospital and 18.37 per cent were practically dead on arrival, and expired shortly afterwards in spite of vigorous stimulation. If we deduct from the total mortality the deaths en route and the cases admitted in collapse, we find a mortality of only 59.46 per cent of cases which really underwent hospital treatment. By observing the case report it will be seen, first, that 60 per cent had suffered from cholera at least ten hours before admission to hospital, and the majority of cases had no recorded treatment; second, the method of transportation employed, the distance to the hospital, and the rough roads must necessarily be injurious factors, if not inducing fatality in many cases.

MORBID ANATOMY AND PATHOLOGY.

It is to be regretted that no facilities were at hand at the hospital to make post-mortem examinations, or laboratory in which to make pathological investigations.

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[a] This statement is at variance with the experience of the other physicians who have used benzozone during the cholera epidemic. The records of the Santa Mesa Hospital show that the mortality was 100 per cent among the patients who did not receive benzozone, and 72 per cent among those treated with benzozone exclusively, or with benzozone in conjunction with other remedies. See report of the superintendent of Government laboratories (Appendix M) on treatment of cholera by benzoyl-acetyl peroxide.—Dean C. Worcester.

All dead bodies were sent to the cholera morgue, and a complete report requested by letter, through the commissioner of public health, but as yet the request has not been complied with.

It was observed, however, that rigor mortis usually occurred early, and the deaths occurring during the algid stage invariably presented the shrunken and livid appearance.

Summary.

Total number cases recorded		186
Number cases cholera		185
Number cases not cholera		1
Number deaths in hospital		144
Number deaths en route to hospital		8
Number discharged cured		34
Total number of deaths		152
Total number of deaths under six hours		43
Total number of deaths over six hours		101
Total number of deaths before arrival		8
Total death rate	per cent	82.16
Total death rate under six hours	do	23.11
Total death rate over six hours	do	59.05
Total death rate before arrival	do	4.33

Admission by nationalities.

	Men.	Women.	Children.	Total.
Americans	4			4
Europeans	3	1		4
Filipinos	105	33	19	157
Chinese	20			20
Japanese	1			1
Total	133	34	19	186

CHOLERINE AND AMBULATORY CASES.

No ambulatory cases, cholerine, or choleraic diarrhea, as recorded in observations, principally in India, has been observed.

CHOLERA SICCA.

Of the total number of cases seen by the writer, 0.1 per cent only proved to be cholera sicca. In these cases the symptoms of vomiting and rapid collapse were presented, followed by death in from one to two hours, without purging or any attempt at reaction. On post-mortem the rice-water material, so characteristic of cholera Asiatiac, was found in abundance in the bowel.

CHOLERA TYPHOID.

Only one case of cholera typhoid has been observed, this (case No. 2) an American, male, age 26. The usual tpphoid symptoms were presented when this patient entered on the stage of reaction, having previously presented a typical line of cholera symptoms. This case made an uneventful recovery, and was discharged cured May 15, just thirty-two days after admission.

SEQUELÆ.

Of the thirty-four recoveries, the usual sequelæ observed have been anæmia and physical debility. Four cases, all of whom were children, developed parotitis, which resulted in abscess.

Two adults developed bed sores. Ulceration of the cornea was observed in two cases, these also being children.

One pregnant woman, almost at term, died without parturating, this being contrary to the recorded observations in India and in the comparatively recent epidemic in Hamburg.

CONVEYANCE AND DISSEMINATION OF CHOLERA.

It has been recognized for many years that cholera, not unlike typhoid fever, is chiefly conveyed and disseminated through foods and drinks. The usual method of water contamination is evident and conclusive; however, with foods it has not always appeared so clear.

Certain well-marked cholera cases, occurring among the better classes during the first part of April and under circumstances where every recognized precaution could and was thought to have been taken, led the writer to investigate the probability of direct conveyance of infection to foods by means of the fly and mosquito, as referred to in my report of May 1. The reason suggesting this possibility was that these insects were almost invariably observed around cholera cases and cholera-infected localities, and particularly was the fly observed on the ground where cholera excreta had been thrown and in receptacles containing cholera fluids, before disinfection.

A number of mosquitos and flies were caught from these localities and carefully examined under a magnifying glass. The legs, body, wings, and cornu of the mosquito were apparently clean, but with the fly foreign matter of a gummy consistency was found adhering to the fuzz on the legs, the web cups, and cornu. Portions of this were removed and a smear made upon a cover glass, stained by a watery solution of fuchsin, and under a $\frac{1}{12}$ oil emersion an organism identical in morphological appearance with the cholera vibrio was demonstrated.

Cultures have been made by the writer, and colonies are being grown, in the hope that some interesting facts may be deduced, at which time a more extensive report along these lines will be written.

Duration of illness of cases terminating in death, ages under 1 year, 1 to 10 years, 10 to 20 years, 20 to 40 years, and over 40 years, with corresponding death rate, percentages, and totals.

Age.	Total cases.	Before 6 hours.		Before 12 hours.		Before 18 hours.		Before 24 hours.		Over 24 hours.		Total deaths.	Total per cent.
		Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.		
Under 1 year	2	2	100	....	....	....	....	....	....	....	....	2	100
1 to 10 years	14	3	21.42	3	21.42	1	7.10	....	....	3	21.42	10	71.42
10 to 20 years	20	2	10	....	....	4	20	....	....	6	30	12	60
20 to 40 years	114	29	25.21	21	18.26	9	7.82	7	6.08	28	24.33	94	81.73
Over 40 years	35	7	20	6	17.14	1	2.85	3	8.57	17	48.57	34	97.14
Total	185	43	23.11	30	16.12	15	8.06	10	5.37	54	29.03	152	82.16

The above table is necessarily approximate, for the reason that many of the transfer slips failed to state the age and duration of illness. This information is frequently impossible to secure from natives.

Specimen chart.

[Santa Mesa cholera hospital, Manila, P. I. Board of health for Philippines, April 25, 1902.]

Name, Patricia de Gala; ward 4; bed No. 137; case No. 150; taken sick April 25, 8 p. m.; admitted April 25, 10.30 p. m., diagnosis, cholera; duration of illness before admission, two and one-half hours; sex, female; age, 40; residence, No. 87 Antonio Rivera; district, Tondo; where found, residence; when found, April 25, 8 p. m.; condition, prostration.

LIQUID DIET.

Date.	Hour.	Temperature.	Treatment.	Pulse.	Respiration.
Apr. 25	10.30 p.m.	97	Strych. hypo. 1/60 enema, s. sol. and brandy, hot applications.	80	18
	11 p.m.	97.4	Stool profuse, watery, blood streaked	84	20
	12 p.m.	98	Benzozone (cap.) 0.32 c. c	80	19
26	4 a.m.	97.8	Benzozone (cap.) 0.32 c. c.; retching	81	18
	8 a.m.	96.5	Trans. s. sol. 0.30 c. c. strych. hypo. 1/60	85	22
	12 a.m.	98.2	Benzozone (cap.) 0.32 c. c.; retching, vomiting.	80	18
	4 p.m.	98	Caffeine 0.32 c.c.; egg-nog retained	82	20
	8 p.m.	97.4	Strych. hypo., 1/60, hot applications	84	20
	12 p.m.	97.6	Chlorodyne; cramp limbs, pain abdomen	85	21
27	4 a.m.	97.2	Benzozone (U); strychnine	82	19
	8 a.m.	97.2	Benzozone (U); whisky	81	18
	12 a.m.	96.6	Benzozone (U); retching	84	20
	4 p.m.	97.4	Strych., egg-nog, beef tea	80	19
	8 p.m.	97.8	S. sol. and brandy	80	20
	12 p.m.	97.8	do	80	18

SEMILIQUID DIET.

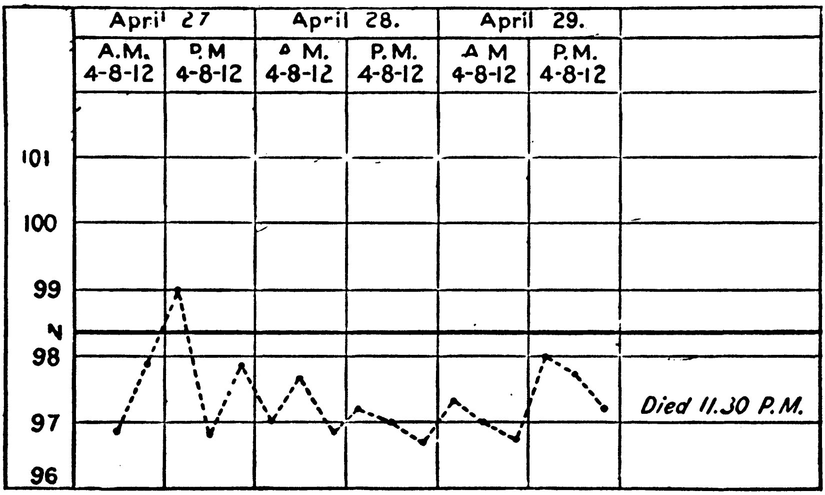
Date.	Hour.	Temperature.	Treatment.	Pulse.	Respiration.
May 13	4 a.m.	98.4	Benzozone (U)	74	18
	8 a.m.	98.2	I. Q. and S. (tonic)	72	17
	12 m.	99	I. Q. and S	72	17
	4 p.m.	98.2		74	18
	6 p.m.	98.6	I. Q. and S	74	17
	12 p.m.	98.4		74	17
14	4 a.m.	98.2		72	17
	8 a.m.	98.4	I. Q. and S	73	18
	12 a.m.	98.6	do	72	17
	4 p.m.	98.4		72	16
	8 p.m.	98.2	I. Q. and S	72	17
	12 p.m.	99		74	16
15	4 a.m.	98.4		72	16
	8 a.m.	98.4	I. Q. and S	74	17
	12 a.m.	98.4	do	72	16
	4 p.m.	98.4	Discharged, cured, this date	72	16

Temperature chart.

[Santa Mesa Cholera Hospital, Manila, P. I. Board of health for Philippines, April 27, 1902.]

Name, Castar Vallensuela; sex, male; age, 18; admitted April 27, 10.30 a. m.; ward 3; bed No. 48; diagnosis, cholera.

CASE NO. 171.



Termination—Death.

CONCLUSIONS.

In making a summary of the foregoing it will be observed—

First. That the symptoms presented, the large mortality, and the verification at the morgue and laboratory indicates that this type of cholera asiatica is most virulent.

Second. Cases seen shortly after being attacked (under six hours) and properly treated at home or removed to hospital stand a reasonable chance of recovery.

Third. Cases not seen or treated for five or six hours after the attack begins almost invariably prove fatal, regardless of treatment.

Fourth. It would appear from the records that it would be better to treat cases in their homes, if practicable.

Fifth. If removal is necessary, and in most cases unquestionably it is, cases should be stimulated, moved quickly and comfortably, yet the shortest distance possible, and with the greatest care.

Sixth. The definite lines of treatment advocated from time to time have never proved of material service in true cholera. The eliminative treatment of Johnson, the ice-bag treatment of Chapman, the various antiseptic methods directed to the destruction of the vibrio in the intestinal canal, or the drugs designed to counteract the physiological effect of the cholera toxines are not as yet conclusive. Practically, therefore, the only remaining treatment of proved value is the purely symptomatic and expectant one.

Respectfully submitted.

THOMAS R. MARSHALL,
Captain and Assistant Surgeon, U. S. Volunteers,
Surgeon in Charge.

EXHIBIT B.

REPORT OF THE SUPERINTENDENT OF THE PAIL SYSTEM.

OFFICE OF THE PAIL SYSTEM,
Manila, P. I., July 1, 1902.

The COMMISSIONER OF PUBLIC HEALTH,
Manila, P. I.

SIR: I have the honor to submit the following report on the pail system since it was first taken up by the board of health:

Owing to the unsanitary condition of the closets and to the methods in use for the collection of fecal matter in the plague-infected districts of Binondo, San Nicolas, and Tondo it was decided by the board of health that some other form of closets than those actually in use must obtain in order that plague and other epidemics be reduced to a minimum. After considerable investigation by individual members of the board of health, the board as a body came to the conclusion that, as sewers were out of the question at present, that of the conservancy systems, the only other alternative, the pail or bucket system is the one most generally favored by hygienic authorities. This system avoids the storing of excreta in vaults or near the premises, offensiveness, or nuisance of scavengers and the danger of the escape of effluvia or excreta to the detriment of public health.

The actual birth of the pail system arose from the following resolution of the board of health at a meeting held on August 22, 1901:

Resolved, That it is for the best interests of the public safety that the pail conservancy system for the collection and disposal of night soil be inaugurated at once in the city of Manila in such places as necessity demands and the board of health may direct; that all open and foul vaults be closed as each closet is established; that the city install the system, paying cost, making it a lien against the property, the owner of the property to collect the same from the tenants and subtenants; that the cost of removing the excreta be borne by the person renting the property.

MANUEL GOMEZ, *Secretary.*

During a discussion held at the same meeting it was decided that the system should not be installed on premises already supplied with modern closets, or where other arrangements were in sanitary condition, but that the system should first be introduced into the plague districts of Binondo, San Nicolas, and Tondo, together with closing of the offensive overground vaults and other unsanitary methods of collection. At the same time the system was to be introduced into the schools, markets, and public buildings.

A committee was appointed to draw up a report on the collection of night soil, with estimates, etc., from whose report (as addressed to the secretary of the interior, United States Philippine Commission) the following extracts are made:

"I have the honor to state that a careful inspection of the various districts of the city has been made in regard to the different methods employed in the collection and the disposal of night soil, and to state that, in many instances, they have been found unsanitary and unsatisfactory. The following systems are in use in the city:

"First. Trap connected with private sewers which empty into the river, various esteros, and the bay. Many of these traps are obsolete and unsanitary.

"Second. Traps connected with cesspools. The same remarks apply to these traps.

"Third. Open vaults constructed of solid masonry.

"Fourth. Earth closets.

"Fifth. Barrel or bucket system.

"Sixth. Pits with superstructures.

"Seventh. Superstructures without pits. The deposits in this case are made on the surface, and are removed by hogs, rain, and dessication."

In view of the bearing that this important matter has on the health of the community, especially in regard to continued fevers, it was deemed the duty of the board of health to confer with the municipal board in regard to the installation of the conservancy system, it being generally understood that the introduction of a proper trap and sewer system would be out of the question for the next four or five years. As a result of a joint meeting of the board of health and the municipal board the following resolution was passed by the latter September 28:

Resolved, That pending legislation on the subject, the collection and disposition of night soil in the city of Manila and the installation of the pail system (so called), all odorless excavators, pumps, and other equipment now in possession of the city and used for such purposes be turned over to the board of health, and that it is the understanding of the board that the administration of this work should be entirely in charge of the board of health.

A. L. B. DAVIES, *Secretary*.

The pail or bucket system for the collection and the removal of fecal matter is generally regarded by hygienic authorities as second only to a public sewer system when properly installed and operated. The system is highly sanitary and superior to all other surface methods. The cesspool system provided with proper traps may also be regarded as an excellent method provided the cesspools are made water-tight by use of proper cement in their construction and regularly excavated by odorless excavators.

There are many serious objections to the large number of cesspools in the city for the reason that they are constructed of loose masonry, and thus admit of ground infiltration and infection.

The board of health recommends that the pail system be installed first in densely populated districts, especially in those occupied by Chinese, where plague exists and where sanitary conditions at present are worst. The most prominent of these districts are Binondo, San Nicolas, Tondo, and Santa Cruz. The system should also be introduced for the use of public schools, markets, buildings, prisons, hospitals, military garrisons, etc. It is not proposed, however, to introduce the system into buildings or on premises already supplied with modern closets or where other arrangements are regarded by the board of health as sanitary and satisfactory.

In order to install the pail system in Manila to the exclusion of all methods, 12,000 sittings will be necessary, thus requiring 24,000 pails, or 2 pails for each sitting. The capacity of each pail is sufficient to receive the excrement from 30 people; however, in making estimates for the number pails required the number of persons for each sitting has been reduced to 20. Taking into consideration the number of houses in the city provided with sanitary arrangements and others that could be rendered so by the introduction of modern traps, repairs or alterations, it is believed that not over 6,000 sittings, or 12,000 pails, would have to be introduced to effect a satisfactory change in the collection of night soil. In order to accomplish this it would be necessary to make the following purchases:

12,000 pails, at $1.75 per pail	$21,000
6,000 commodes or closets, at $1.50 each	9,000
40 carts, at $30 each	1,200
54 American horses, at $150	8,100
40 sets of harness, at $20	800
1 steam launch	10,000
1 iron-lined barge	16,000
7 odorless excavators with pumps	
(Fourteen horses are needed for the excavators.)	

The superintendent of the department of streets, parks, etc., states that the launch now used by the city for towing garbage, etc., could be used also for the towing of night-soil barge.

There are also 8 odorless excavators (1 out of condition) in the city partly owned by the city and partly by the quartermaster's department. I presume that those owned by the latter could be secured in case the entire removal of night soil in the city were turned over to the board of health. It is also possible that one of the barges owned by the city and used for the removal of garbage could be fitted up as a night-soil barge.

Should this system be authorized by the Commission it is believed that the cost of the plant and running expenses should be distributed as follows for the city:

Carts	$1,200
Horses	8,100
Harness	800
Launch	10,000
Barge	16,000
Excavators	
(Cost of the excavators can be obtained from the proper owners.)	
12,000 pails	21,000
6,000 commodes	9,000

Monthly expenses of the city for operating launches, odorless excavators, and barge launch.

1 launch master	$100.00
1 pilot	30.00
1 engineer	30.00
1 assistant engineer	25.00
1 wheelman	25.00
2 firemen, at $15	30.00
3 sailors, at $10	30.00
30 tons of coal, at $7.50 a ton	225.00
Incidental expenses	22.50
Odorless excavators—	
7 drivers, at $60	420.00
77 laborers, at $7.50 per month	575.50
Feed for 14 horses, at $10 per day	300.00
30 pounds charcoal, at 3 cents a pound	.90
Barge—10 bargemen, at $10 per month	100.00
Total	1,913.90

It is believed that the charges made against the property owners for the emptying of cesspools will pay for the expenses of excavators.

Monthly expenses of the houses where pails are installed.

1 superintendent	$150
40 cart drivers, at $15 per month	600
100 laborers, at $10 per month	1,000
Forage for 40 horses, per month	800
Total	2,550

The city and army are expected to pay their pro rata of the monthly expenses for the system introduced in schools, prisons, public buildings, barracks, etc.

Quite a number of the business firms of the city have already asked the privilege of submitting bids for the construction of pails and commodes in case the system be introduced, and it is possible that figures lower than those given can be secured in their manufacture.

The report which was submitted by the commission of public health was accompanied with drawings and specifications of pails, commodes, and midden sheds.

Considerable correspondence passed between the municipal board, superintendent of streets, and the board of health in reference to launch, barge, and excavators, etc., and the following estimate was received from the superintendent of streets in regard to the cost of running excavators, launch, etc.:

Expense of operating one odorless excavator per day.

1 driver, American	$2.00
11 laborers, at 25 cents each	2.75
2 horses, feed, at 75 cents each	1.50
1 pound charcoal	.03
Total, per day	6.28

Number of excavators in use	2
Number of excavators needed	4
Number used by military authorities	2
Number in city (1 unserviceable)	8
Number of pumps	7

Each excavator requires one pump, 120 feet stiff-joint hose, and 300 feet of water hose. One American in charge of excavators, at $100 per month. If work in the city is to be thorough, the 7 excavators will be required.

Cost of running launch per day, $20.

Crew.

1 launch master		$100.00
1 patron		30.00
1 engineer		30.00
1 assistant		25.00
1 steersman		20.00
2 firemen	each	15.00
3 sailors	do	10.00
1 ton coal per day		7.50
Incidentals (varies)		.75

Would say here that the launch belonging to the street department is able to do all the towing for the city.

An up-to-date barge for garbage, such as is used in the cities of the United States, will cost $16,000. Cost depends entirely on kind and size.

Cart, cost	$30
Horse	240
Harness, single set	20
Native driver, per month	15

Wages of ordinary day laborers, 25 cents, United States currency.

The following resolutions were also passed by the municipal board about this time:

Resolved, That the city engineer be requested to report in detail the number of odorless excavators, pumps, and sanitary dump carts now in possession of the department, with a view to turning over to the department of health all property of this character not absolutely necessary for the use of the city in the disposal of swill, garbage, and refuse; also the number of horses and drivers now employed by the city in connection with such equipment, the object being to relieve the city engineering department of all cleaning of closets, cesspools, and latrines, and the disposition of night soil.

Resolved, That, pending legislation on the subject, the collection and disposition of night soil in the city of Manila and the installation of the pail system, so called, all odorless excavators, pumps, and other equipment now in possession of the city and used for such purposes be turned over to the board of health, and that it is the understanding of the board that the administration of this work should be entirely in charge of the board of health.

On December 7, the following resolution was introduced by Major Maus and approved:

Be it resolved by the board of health, That the commissioner of public health is authorized to receive at once bids for the manufacture of pails, commodes, and midden sheds for the installation of the pail system.

Bids were asked for upon the plans and specifications that had been forwarded to the secretary of the interior for approval, but were all thrown out by the board of health by the following resolution:

Whereas all contractors bid on specified woods and the price being excessive: Be it

Resolved, That all bids be rejected and the plans and specifications be so modified by the assistant sanitary engineer as to conform to the new conditions, and be readvertised.

Major Maus again submitted the proposition to send some one to Hongkong for the purpose of placing bids for pails and commodes in that city; also at Canton if necessary; that the bids should be opened at Manila and that the board of health should then direct the agent at Hongkong or elsewhere to contract for such bids if that body deemed necessary. From information received, he also stated that there were ample facilities in Hongkong for the manufacture of pails and commodes, and that they could be secured there at a much more reasonable figure than in Manila.

It was decided at a meeting held by the board of health on January 28, that Maj. F. A. Meacham, chief health inspector, be selected by the board to visit Hongkong for the purpose of investigating the pail system in that city, and for placing bids there or in Canton for the manufacture of pails.

In answer to a request for certification of their action in selecting Major Meacham to visit Hongkong, the following communication was received:

JANUARY 24, 1902.

Maj. L. M. MAUS,
Commissioner of Public Health, Manila.

SIR: I beg to acknowledge receipt of two resolutions, inclosed with your communication of January 23, one with reference to the securing of bids on pails, etc., for the installation of the "pail system" in Manila, and the other with reference to sending of someone by the board of health for the Philippine Islands to Hongkong or other ports to investigate the practical working of the "pail system" there, and if possible to obtain bids on the pails, etc., necessary for its installation in Manila. The policy adopted by the board of health with reference to securing the bids above referred to is approved, as is the sending of some competent person to Hongkong with a view to ascertaining how the pail system works in that place, and to secure bids on supplies needed for its installation in Manila, if practicable.

I beg to suggest that in view of the fact that the chief health inspector is undoubtedly competent to make this investigation, and has now been working for a long time without opportunity for relaxation, he be sent to Hongkong for this purpose, if it is practicable to do so without interfering too seriously with the necessary work under his immediate control.

Very respectfully,

DEAN C. WORCESTER,
Secretary of the Interior.

On November 18, 1901, the following resolution was read and adopted by the board of health in compliance with a resolution of the United States Philippine Commission of November 9, approving installation of the pail conservancy system, as received by the board of health for the Philippine Islands and city of Manila:

Be it resolved, That it is necessary for the public health that all vaults and closets, unsanitary cesspools, unsanitary sewers, foul and filthy water or earth closets, in the city of Manila, be closed or repaired to the satisfaction of the board of health, and the pail conservancy system be installed as soon as possible in all places where such vaults, unsanitary cesspools, sewers, etc., have been closed or where it is otherwise deemed necessary, and it is recommended to the municipal board that the city pay for the cost of installing the entire plant, and that the property owners or their agents be required to reimburse the city for the cost of the pails, commodes, and other appliances on their respective property, as well as for the cost of removal of the night soil to the wharf from their houses or premises; that the cost of the pails, commodes, and other appliances on the property, together with the cost of the removal of the night soil, to be made a lien against the property until paid for, the cost of all other property and material necessary for the operation of the system and the removal of the night soil from the wharf to the sea to be paid by the city.

Be it further resolved, That a copy of this resolution, with recommendations covering the cost of the installing of the pail system, be immediately forwarded to the municipal board for enactment as a city ordinance and authorizing the board of health to prescribe such rules and regulations, approved by the municipal board, as may be necessary for carrying the same into effect, fixing penalties for its violation and placing the actual work under the direct management of the board of health.

In furtherance of the above resolution, ordinance No. 9 was passed by the municipal board, a copy of which reads as follows:

AN ORDINANCE authorizing the board of health to install the so-called pail conservancy system at the expense of the property owner.

Be it ordained by the municipal board of the city of Manila that:

SECTION 1. The collection and disposal of human excreta in the city of Manila shall be under the direction and supervision of the board of health.

SEC. 2. The cost of collecting and hauling the contents of any water or earth closet, privy vault, cesspool, or latrine from the premises to the receiving depot to be established by the board of health shall be at the expense of the property owner.

SEC. 3. Whenever it comes to the knowledge of the board of health that a water or earth closet, privy vault, cesspool, or latrine is offensive or dangerous to health, a notice shall be immediately served on the owner or agent of said premises, directing said owner or agent to close said water or earth closet, privy vault, cesspool, or latrine, and in lieu thereof install the so-called "pail conservancy system" under the direction and supervision of the board of health.

SEC. 4. Whenever any owner or agent of any premises neglects or refuses to comply with the directions of the board of health within ten days after receipt of the notice mentioned in sec. 3, the board of health shall proceed to close the objectionable vault or cesspool and install said "pail system."

SEC. 5. When the work of closing the objectionable vault and installation of the "pail system" is completed the board of health shall serve on the owner or agent of the premises an itemized statement of the expense of said work.

SEC. 6. If the owner or agent fails to pay within thirty days the expense incurred in the installation of the pail system, the city attorney shall institute suit to recover of the owner the money so expended by the city.

SEC. 7. The board of health shall adopt such rules and regulations as may be necessary to carry out the provisions of this ordinance.

SEC. 8. Any owner or agent who shall fail to comply with the provisions of this ordinance shall, upon conviction thereof, be deemed guilty of a misdemeanor, and fined any sum not exceeding fifty dollars ($50), or imprisoned not exceeding thirty (30) days, or both.

SEC. 9. This ordinance shall take effect and be in force from and after the first day of January, 1902.

Enacted December 26, 1901.

On January 28 the committee on plans and management of the pail system submitted a report presenting drafts of modified plans and specifications for the pails, commodes, and midden sheds and of advertisements for bids. After careful consideration by the board and certain modifications that were approved and adopted, it was moved that the commissioner of public health be authorized to advertise for bids for pails, commodes, and midden sheds as per specifications.

At the same meeting action was taken on the letter from the honorable secretary of the interior with reference to the selection of Major Meacham visiting Hongkong to investigate the pail system in operation there and to obtain bids for pails, etc. Major Maus thereupon moved that in conformity with the resolution of the 17th instant and the letter of the honorable secretary of the interior that the board of health authorize Maj. F. A. Meacham, chief health inspector, to visit Hongkong and such other parts in China as might be deemed necessary with a view to investigate the pail system and securing bids for pails. After some time in Hongkong the following cablegram was received from Major Meacham on February 3:

BOARD OF HEALTH, *Manila:*

Eleven samples, including six varieties; twenty-five different estimates; leave Monday, *Rosetta Maru.*

MEACHAM.

After due deliberation by the board of health, the tender of W. S. Bailey & Co., of Hongkong, for $4.42, Mexican currency each, was accepted, and all other tenders and checks were returned to the respective bidders with a circular letter informing them that the contract had been awarded as above.

It was found after the bid had been accepted that certain modifications in pails would have to be made, and after considerable correspondence between the board of health and W. S. Bailey & Co. the same resulted in a new bid from Bailey & Co. (including the modifications) of $4.10 each, Mexican currency. This bid was accepted and work ordered to be commenced immediately.

The rough details for the installation of the pail system having been settled upon by the board of health, it was then decided to appoint a superintendent of pail system, 5 overseers, and 3 collectors, in order to thoroughly organize the working details of the installation of the system.

On account of the amount of work entailed on the board of health by the cholera, the sending of the contract to Bailey & Co. for signature was delayed from time to time until May 6, at which time the following letter was received from Bailey & Co.:

HONGKONG, *May 6, 1902.*

The BOARD OF HEALTH, *Manila:*

(*Quotation.*)

For 12,000 China pine buckets, as per our amended tender dated April 10, 1902. Terms and delivery as per said tender.

Price, United States gold, $23,250 (twenty-three thousand two hundred and fifty), being equivalent of $50,000 Mexican, at 1s. 11d. or 46½ cents gold to one dollar Mexican, which was the rate existing when our tender was made.

W. S. BAILEY & Co.

Contracts were signed by the parties concerned and the work of making pails actually commenced.

The contract for the erection of midden sheds was awarded to McKay & McKinnon at the following prices, and the work commenced: Eight public midden sheds, $9,714.28 Mexican (as per specifications and plans).

It is extremely unfortunate that through the death of the much lamented Maj. F. A. Meacham, who was chairman of the committee of the pail system, a great many of the papers and data relating to the pail system have been unaccountably lost. It is, therefore, almost impossible to give a complete record of the work done on the pail system up to April 19, the date on which the present incumbent took over the management.

Great credit is due, however, to Major Meacham for his heroic efforts and conscientious work in carrying through a project which at first received considerable opposition.

The following resolution of the board of health on March 13 expresses the appreciation of his untiring labors:

"*Resolved* (on motion of Major Maus), That a vote of thanks to Major Meacham be extended by the board of health for his excellent work in carrying out successfully the efforts of the board of health in securing a suitable and proper pail at a satisfactory price, which he has unquestionably accomplished in Hongkong by his persistent work."

Although the organization of the pail system commenced from the date of the appointment of the superintendent, no authorized assistance was given him until May 10, at which time 3 collectors, 1 bookkeeper, 3 overseers, and 1 clerk were appointed. From this date, then (May 10), the actual organization of the pail system commences. The overseers were immediately placed at work in Santa Cruz, San Nicolas, and Tondo to make house-to-house inspections of closet arrangements with a view to ordering repairs or installation of the pail system. They acted under the following instructions:

INSTRUCTIONS TO OVERSEERS OF THE PAIL SYSTEM.

1. Order minor repairs, such as covering seat holes, ventilation pipes, and repair floors, if the following conditions exist:

(*a*) Vault boarded over, using board seats. Order the floor to be tightly closed, cover seat holes, and place ventilation pipes.

(*b*) A vault boarded over, using holes in the floor. Make the floor tight, construct covered seats over holes, and place ventilation pipes.

(*c*) Tiled floor with wooden seats. Cover seat holes and place ventilation pipes.

(*d*) Vault with open seats upstairs and cut into downstairs with open seat. Wall in the lower part of the vault, removing the closet. The upstairs seat may remain by covering seat holes and placing ventilation pipes.

2. Where there is a vault downstairs with seats and a sheet-iron pipe leading down from upstairs closet, the upstairs-closet arrangement should be removed and the closet downstairs ventilated and seat covers placed, the pail system to be established upstairs.

3. Where an open vault with loose boards on top and not completely covered exists, the same should be properly covered with new floor, with covered closet seats and ventilation pipes. In case this order is not complied with, to order installation of pail system after removing vault.

4. Where there is one large vault with inclined planes or inclined pipes leading into it from various closets, with no flush or a poor flush, leaving the chance for excrement to stick to the sides, the vault should be removed or filled and the pail system established.

5. Where a closet is supplied with cast-iron hopper with ordinary hand trap without a good water flush, or the same with a small flush or no flush, either with or

without a pipe leading into the vault, the hopper should be removed, and if the vault is in good condition the seat hole may be covered with a lid and the vault must be ventilated.

6. All closets built out over esteros or the bay or the river, with seats directly over the water, or closets connecting with esteros at or above low-water mark, shall be removed and pail system established.

7. Any closet, whether sanitary or not, emptying into esteros at or above low-water mark will be removed, unless in case of a sanitary closet the people are willing to extend the discharge pipe to the center of the estero below low-water level. On small esteros where there is not a good flow of water at changing of the tides you shall not permit a closet to empty into same.

8. All earth cesspools or makeshifts for vaults, such as iron tanks or barrels, or earth closets or other form, shall be condemned and removed and pail system established.

9. Installations will not be made in nipa houses, unless the owner is willing and able to bear the expense. Where nipa colonies exist in the exterior of blocks the number of houses and the number of inhabitants in same will be stated preparatory to installing public closets in a special shack to be built out of nipa, bamboo, and suale, at the expense of the city.

10. A vault shall be considered to be in good condition if no seepage shows on the outside, and if same seems to be solidly or well built.

11. The following repairs or changes may be ordered by this department, with the approval of the assistant sanitary engineer:

Repairs to floors, repairs to seat, seat covers, ventilation pipes, in all cases where no vents are provided.

Repairs to the vault (when the same are merely nominal) and the removal of iron hoppers or pipes or any other unsanitary arrangement connecting with the vaults.

The repairs or changes necessary shall be specified on the inspection blank. The inspection blank shall also state the general condition of the house as fair, good, or bad, etc., and also conditions of the yards and courts, as to whether same shall be refloored or repaired.

12. Where it is obvious or in the opinion of the overseer evident that a vault or other closet arrangement is in such a condition that it should be removed, the overseer shall not make recommendations as to repairs, but shall recommend it to be condemned and pail system established in its place. If an overseer is in doubt in regard to the advisability of condemning a vault, or where question exists as to whether same should be condemned and removed, it shall be stated on the inspection blank for reference to the assistant sanitary engineer.

The following report on the "methods of collecting night soil for the city of Manila at the date on which the disposition of night soil was taken over by the superintendent of the pail system" was forwarded to the commission of public health on June 19. This report was compiled from a synopsis of the reports submitted by the overseers:

REPORT OF THE METHODS OF COLLECTING NIGHT SOIL FOR THE CITY OF MANILA ON MAY 1, 1902, BEING THE DATE UPON WHICH THE DISPOSAL OF NIGHT SOIL WAS TAKEN OVER BY SUPERINTENDENT OF PAIL SYSTEM.

JUNE 19, 1902.

The COMMISSION OF PUBLIC HEALTH, *Manila*, *P. I.*

GENTLEMEN: I have the honor to make the following report in regard to methods of collection of night soil up to the time that I took over the same as superintendent of pail system.

It is very difficult to enumerate the various methods in vogue for the collection and disposal of night soil, as almost every conceivable method is used, including every known style of vault, cesspool, sewer, and closet arrangement that one could think of. I describe a few of the existing methods, the same being compiled from reports and inspections made by the overseers of the department.

The most common method of collection is through the agency of stone vaults of more or less bad construction. In the majority of cases these vaults are built as a part of the house itself, and are generally above ground. They are usually built of soft stone, commonly known as "Gaudalape," without cement facing or any other attempt to smooth the interstices, and after six months' use are in a very filthy condition.

In probably 75 per cent of the cases which have come to my notice there is no way to clean the vault after it is once filled, except by moving the floor of the closet or tearing down a portion of the wall to permit of ingress. The latter method is usually employed, the walls afterwards being patched up on the outside, with more or less questionable success.

In the majority of cases the vault is covered first with a wooden floor and afterwards tiled. The seating arrangements are of the most primitive form, in many cases being no more than round holes cut into the floor itself. In other cases I find wooden seats constructed; with very few exceptions, and these only in new houses or houses which have been remodeled since American occupation, do we find any attempt made toward strictly sanitary closets; and these we find only in houses occupied or owned by Americans or Europeans. In most cases there is no attempt made to furnish a water-closet with water trap and ventilating pipes in connection with this vault construction; but, on the contrary, the seats are open, and whatever ventilation the vault receives is through the seat holes. In many cases I have found vaults on the lower floor with ordinary wooden privy seats and the upper floor having seats connected with iron pipes of galvanized sheet iron leading into the vault on the lower floor, leaving a length of ten to twenty feet of pipe to become fouled, and in most cases there is no attempt to flush or clean the same.

In most cases where vaults are used the excrement is removed by contractors in more or less tightly closed barrels, conveyed to barges by a carabao cart, and then taken down the river and dumped anywhere within one-half mile and 5 miles of the entrance to the river, the distance depending on the darkness of the night or the location of the harbor police boat.

This excrement is removed by the contractors at a cost of 80 cents (local currency) per barrel. The excrement from public buildings, military reservations, and in a good many private dwellings is removed by odorless excavators belonging to the board of health, at a cost to private parties of $10, Mexican, per load of 500 gallons.

My overseers are now gathering data preparatory to ordering minor repairs made to such closets and vaults as can be made sanitary at nominal expense. These changes and repairs consist mainly in providing seat covers, ventilator pipes, repairs to floors and vaults, and sealing same up tightly so as not to permit the gases to escape other than by way of ventilation pipes. Outside of these old stone vaults, probably the most common style of closet is one built directly over the waterways and bay of Manila.

The majority of the closets built over the waterways are of the flimsiest construction in the first place, although there are some very elaborate contraptions with tiled floors and modern water-closets that still empty directly into the esteros usually above low-water mark. In nearly every case of closets situated over or emptyinto waterways, I find that the point of emptying is above low-water mark, and when the tide is out the deposits are left high and dry, throwing off an unbearable odor, and being exposed to the action of flies and other insects for from eight to twelve hours daily. There is not sufficient current, in fact, in the esteros of the city to carry this deposit away bodily, but it is gradually dissolved and mingles with the water itself, making a putrid, disease-breeding open sewer of every waterway in the city. These closets are all about to be condemned and removed by authority of city ordinances and pail system established in their place.

In the nipa districts there are but few closets of any description, the nearest approach to the same being a tiny bamboo house built up about 6 feet from the ground, the excrement being deposited on the top of the ground itself, and the collectors of same being the hogs and poultry of the district. In some few isolated cases I find that shallow pits have been dug in the ground and are covered with a few pieces of bamboo to stand on, the pits being covered over with earth when full and a new pit dug. Unless one knows the actual location of these old pits he is liable to go through into one of them while he is looking for a new one. In the outlying districts of the city there is no attempt whatever made toward closets of any description, but the people use the open lots in the vicinity of the houses for all purposes of that character.

In some places in the city a very primitive form of "pail system" is in existence, same being in the form of barrels under a wooden seat, the barrels when full being removed by contractors.

Very respectfully, B. H. BURRELL, *Superintendent.*

Since May 10 (the actual date of the commencement of inspections by the overseers) they have submitted 1,690 written reports on condition of closets in San Nicolas, Tondo, and Santa Cruz.

Of this number 631 were found to be impossible to repair and condemnation proceedings were recommended preparatory to installing the pail system; 67 were found to be in good condition, no repairs necessary, and 570 were found to admit of minor repairs to place them in sanitary condition; 145 were referred to the assistant sanitary engineer for action. Two hundred and seventy-seven houses had no closets of any description.

Two of the collectors were employed in the office to assist in copying inspections, writing out notifications to owners, and tabulating the same.

The following blank was used by overseers for inspections:

The Superintendent of Pail System:

Manila, P. I., ———, *190—*.

Report on manner of collecting fecal matter.

House No. ——— ——— street; district, ——— ———; tenant, ——— ———; number inhabitants, ———; nationality, ———; owner, ——— ———; residence, No. ——— ——— street; district, ——— ———; condition, ———; style of closet and vault, ——— ———; repairs or changes to be made, ——— ———; condition of house, ———; yard, ———; necessary to install pail system (yes—no), number of seats, ——. ——— ———, Overseer.

The following blanks were used for notifications to property owners, being written in Spanish, for the reason that 99 per cent of the property owners are conversant with that language:

Manila, P. I., ———, *190-*.

Sr. ——— ———:

Habiendo llamado la attención de la Junta de Sinidad que las letrinas de la casa Numero ———, Calle de ——— ———, Distrito de ———, se hallan en malas condiciones sanitarias, se le notifica a qua haga los siguientes cambios ó reparaciones en el deposito de las hecas fecales:

Dichos cambios ó reparaciones se harán dentro de diez dias, despues de recibida esta notificación, y si trascurrido este plazo las obras no se han hecho, en tonses se harán por cuenta de la Ciudad y los gastos hechos serán cobrados al propietario.

Se llama especialmente la atención sobre la seccion 6 de la Ordenza Nu. 8 publicado el 12 de Junio de 1901, Orden General Nu. 25, referente al autoridad.

Respetuosamente,

——— ———,

El Superintendente del "Pail Sys'm."

Approved.

——— ———,

Assistant Sanitary Engineer.

Manila, P. I., ——— ———, *190—*.

Sr. ——— ———:

Habiendo llamado la atención de la Junta de Sanidad que las letrinas de la casa número ———, calle de ——— ———, distrito de ———, se hallan en malas condiciones sanitarias, se le notifica á que haga los siguientos cambios en el depósito de las hecas fecales:

Dichos cambios se harán dentro de diez días, después de recibida esta notificación, y trascurrido este plazo, las obras no se han hecho, entonces se harán por cuenta de la ciudad, y los gastos hechos serán cobrados al propietario.

Se llama especialmente su atención sobre la sección 8 de la Ordenanza Nú. 9, publicado el 26 de Diciembre de 1901, que dice así:

"Cualquier dueño ó agente que no cumplierá con las prevenciones de esta ordenanza, previa convicción, será declarado culpable y condenado á pagar una multa que no excederá de 50 dollars, ó prisión que no excederá de 30 días, ó ambas penas á la vez."

Después que los cambios especificados hayan sido hechos, seran instalados sobre el piso ——— asientos y cubetas receptoras de las hecas fecales.

Respetuosamente,

——— ———,
El Superintendente del "pail system."

Approved:

——— ———,
Assistant Sanitary Engineer.

On June 12 Mr. H. D. Osgood, assistant sanitary engineer, was directed by the board of health to assume direct control of the pail system, acting as an advisory committee with Mr. Burrell in all matters pertaining to the system. This was a very necessary step, as the board was entirely engaged with the cholera and had no time to take up the pail system in detail.

The first actual installation was made on May 7 at the Santiago Hospital, where 11 seats were installed. The pails used for this purpose were a portion of those purchased by the board of health in Singapore, through Dr. Bourns, consisting of 722 galvanized-iron pails with one cover for each two pails. These pails were found to be very unsatisfactory on account of their liability to lose their shape with the slightest rough usage, thereby preventing the lid or cover from fitting down closely at all points, permitting the excrement (if at all fluid) to be forced through the top when carried on bull carts or other vehicles without springs. The pails were never satisfactory except when absolutely new and the tops of the pails perfectly round. They have been used, however, to a considerable extent, as no others were available.

On June 19 public installations were made in Tondo at the following points:

On Calle—	Pails.
Ascarraga	30
Zaragosa	20
P. Rada	20
Pescadores	10
Vilvao	10
Lacondola	10
Leon Thirteenth	10
Morga	15

These stations were established in cooperation with the Tondo board of health station for the suppression of cholera, the closets in use by the natives being at the same time closed to further use, they being forced to empty all fecal matter into these receptacles. The condition at Tondo Beach has been greatly improved thereby, as this was formerly the receiving point of all the fecal matter of that district. These pails have been removed daily by this department in barges that were bought on June 20, the same being poled to a distance of 4 miles from the shore and the buckets there dumped and washed.

On July 1 the pail system was ordered to take over the removal of night soil from the various public buildings, schools, military buildings, etc. This was done, notwithstanding the fact that the system was illy prepared to take over the same on account of the lack of transportation and proper receptacles for removing the fecal matter. The method employed was as follows:

Bull carts were hired and 15 galvanized-iron pails were placed on each cart. Each cart was further supplied with 2 shovels and a working force of 3 laborers. The majority of the places to be cleaned were ordinary dry earth pan closets of the army pattern. These were cleaned into the pails by the workmen and the pans were afterwards washed and disinfected with chloride of lime, the pails being hauled to a central station established on Calle Ascarraga, at the sea, opposite the "Matadero," from there being transferred to barges and taken out into the bay to be dumped and washed.

Having been notified to take over the collection from military buildings, and after having notified the quartermaster-general that we were ready to act upon this order, for several days, dating from July 1, we employed a force of carts and men especially for this purpose, although the places in question were being cleaned daily by the former contractor acting under some private arrangement or agreement with the quartermaster-general's office. Our carts continued to call at the various places daily, prepared to do the work, and in fact made many removals, and they continued to call at these places until we were formally notified that a temporary agreement had been entered into with the former contractor to continue cleaning the military places until such time as the quartermaster-general was satisfied that the work could be done cheaper by the city than by the contractor.

Thorough inspections were made of all the military places by one of the overseers of this office, and a copy of his report, together with information derived from those directly in charge of the cleaning at the various military buildings, was submitted to the quartermaster-general, together with estimates of the approximate amount of pails necessary and a price for cleaning the same. An answer to this letter has not yet been received.

Prior to July 1, 789 pails were removed and cleaned from the public stations in Tondo, and since July 1, up to and including July 15, 4,626 pails have been removed from the following places:

Alonzo Valazquez (public), Azcarraga (public), Zaragosa (public), Padre Rada (public), Pescadores (public), Bilbao (public), Lacandola (public midden shed), Leon 13th (public), Marga (public), Lemery (Tondo public school), Anloague police station, San Fernando police station, Asuncion (Chinese school), Bilibid prison, Aduana, Malate police (Metropolitan), Malate police (Filipinos), Sampaloc police, Crespo school, Arranque market, Trozo police station, San Lazaro barracks, Concordia (Aguinaldo's quarters), Postigo, City corral (Manila), Sta. Lucia, Police (Real Manila), Parian gate, Real gate, Exposition corral, Exposition constabulary, Malate market, Malate cemetery.

The existing dry-earth closets are being changed for the "pail system" as rapidly as commodes for the same can be constructed, it having been found that considerable time was lost in emptying and cleaning the same.

The system of removal by pails from Bilibid has been changed to that of barrels, small bancas having been hired for the purpose of removing the same by way of the estero which passes Bilibid. As the pan closets in Bilibid are cleaned by the prisoners and a considerable amount of water is used in cleaning, same being added to the fecal matter, the pails were found to be a very unsatisfactory method of removal on account of the slopping during transportation by the bull carts and the odor when the carts were passing.

This work of removing from Bilibid was necessarily done in the daytime, as the prison is closed at 5 o'clock, and we were thereby compelled to transgress one of the ordinances of the city, which states that "no fecal matter shall be removed through the city streets between the hours of ——— and ———." In fact, on the 7th instant, one of our bull-cart drivers was arrested by the native police for infraction of this ordinance. A plain statement of the case, however, to the judge of the Santa Cruz court resulted in his discharge, upon the grounds of it being a public necessity, but at the same time the superintendent of the pail system was informed that the nuisance must be abated as soon as possible. All the above-mentioned places have been cleaned daily, and this office has yet to receive a complaint from anyone against the thoroughness or manner of making collections which, by the way, is a condition which did not exist under the former contractor. All of this work is considered by this department to be somewhat out of the ordinary, as it infringes considerably upon the methods of removal which have been decided upon as being the most economical and best from a sanitary point of view. The work, however, being urgent and no appropriation by the city having been made to continue the former contract, we have taken up this matter with the best possible grace, and are continuing the work to the best of our ability.

The cost, however, owing to the method of transportation, etc., has been considerably higher than will obtain when we have the proper appurtenances, at which time the public places at present cleaned by us will be absorbed in the general system.

On the 1st of July the odorless excavators, formerly under the street department, were turned over to this department, and the work has since that time been in our charge.

The work of odorless excavators has been continued as before with few exceptions, they having formerly been used to clean all the municipal and insular vaults.

They have been employed in making removals from private houses. It will probably be found necessary in the near future to discontinue this class of work, using the excavators solely for the purpose of attending to public buildings and cleaning private vaults that will have to be cleaned by this department on account of noncompliance of orders by property owners.

Extra excavator parts and hose to the amount of $7,475.88, United States currency, have been received at a time when they were very badly needed. The work is now going forward smoothly and regularly. One of the excavators which was formerly dismantled to repair others will be placed in commission immediately. This will give us a working force of 4 excavators in place of 3, although in the near future this number of excavators will be entirely inadequate to the demands for their use, on account of the vast number of vaults ordered condemned or removed.

The following places are cleaned whenever necessary by the odorless excavators, in addition to their employment on private work when not otherwise engaged:

Binondo First Boys' School.
Binondo First Girls' School.
Binondo Second Boys' School.
Binondo Second Girls' School.
Concepcion Boys' School.
Concepcion Girls' School.
Ermita Boys' School.
Intramuros School.
Malate Boys' School.
Malate Girls' School.
Paco Girls' School.
Quiapo Boys' School.
Santa Cruz Boys' School.
Santa Cruz Girls' School.
Sampaloc Boys' School.
Postigo Corral.
Cuartel Malate.
Santa Lucia Gate.
Analoague police.
San Lazaro Hospital.
Government Printing Plant.
Sampaloc Girls' School.
Santa Mesa Boys' School.
Santa Mesa Girls' School.
San Miguel Boys' School.
San Miguel Girls' School.
Singalong Boys' School.
Singalong Girls' School.
Tondo First Boys' School.
Tondo First Girls' School.
Tondo Second Girls' School.
American Grammar School.
Paco Fire Station.
Exposition grounds.
Palace building.
City Hospital.
Sampaloc market.
City garden.
Arsenal, Fort Santiago.
Intendencia building.
City hall.
Bilibid.

It is necessary that we should acquire more horses immediately, there being at the present time but six actually belonging to the pail system, and paid for out of the pail-system funds. Of these six, three are almost continually on the "sick report," and were it not for the occasional loan of horses belonging to the board of health and taken from ambulance work, it would be impossible to continue the excavator work.

On July 1 the office bodega, blacksmith shop, and corral of the pail system were removed and consolidated in "Trozo Barracks," the same having been since that time fitted up for the use of the pail system—wagon sheds have been built, office fitted up, stables and blacksmith shops repaired, etc.

The superintendent of the corral for the pail system is also employed by the board of health in caring for the transportation in use by the cholera force, so that at present the corral is used by the board of health rolling stock, etc.

It will become necessary in the near future that the superintendent of the corral, who is paid out of the pail-system funds, shall give his undivided attention to the corral of the pail system, owing to the amount of equipment, horses, etc., he will have in his charge.

The actual equipment of the pail system, obtained since the appointment of the superintendent of the pail system on April 19, consists of the following:

A contract entered into with W. S. Bailey & Co., Hongkong, for 12,000 pails.

A contract entered into with McKinnon & Co. for eight public midden sheds for a total of $9,714.28, Mexican currency.

The purchase of four casquitos for the removal of night soil for the sum of $8,626, local currency.

The purchase of four escort wagons of the insular purchasing agent.

Four odorless excavators turned over from the street department (1 in dismantled condition).

Six horses purchased of the quartermaster department at a cost of $240, gold, each.

Extra odorless excavator parts and hose to the value of $7,475.88, United States currency, purchased in the United States, and various supplies, office furniture and fixtures, equipment of blacksmith shop and the corral.

The actual work accomplished consists in house-to-house inspections of closets, duplicating and tabulating the same, writing notifications to property owners that the "pail system" would be installed, closets condemned or ordered repaired, and the actual delivery of 145 notifications to repair existing closets, the thorough organization upon a working basis of the office force and a system for the collection and disposal of night soil, collection of charges, etc., pertaining to the pail system when the proper equipment shall have been received, and also for temporary work until such a time.

The actual removal and cleansing of 5,415 pails.

The necessary buildings repaired, etc., at Trozo Barracks, tending to the use of the same as a corral, and much other work relating to the system under subjects too numerous to mention.

The total amount of money disbursed to the 1st of July, the beginning of the new fiscal year, being $42,457.57 (United States currency), generally divided under the following heads:

Supplies (insular purchasing agent)	$2,134.06
Pay rolls	3,213.92
4 casquitos	3,800.00
12,000 pails (pine)	24,571.50
6 horses, American	1,440.00
772 iron pails	1,805.00
8 public midden sheds	5,235.00
Office rent, carromatta hire, and bull-cart hire	155.64
Advertising	9.45
Insurance of pails	93.00
Total	42,457.57

A very careful estimate of the cost of operating the system when this department is supplied with proper barges, launch and wagons has been made jointly by the assistant sanitary engineer and the superintendent of the pail system, a copy of which is hereby appended:

OPERATING EXPENSES OF PAIL SYSTEM OF SANITATION WHEN INSTALLATION IS COMPLETED.

Office:	
1 superintendent	$1,800
3 overseers	3,600
3 collectors	3,600
2 clerks	2,400
1 foreman	420
8 foremen	2,400
2 messengers	360
Contingent expenses	2,700
Total per year	17,280

$17,280÷365×6,000=$0.00789 gold per day per bucket=$0.0179 Mexican per day per bucket.

	Mexican.
Corral:	
1 wagon master	$1,200
12 teamsters	10,080
4 cocheros	480
6 laborers	1,095
1 blacksmith	1,080
Forage	5,775
Materials for repairs	800
Shoes, etc	225
Total	20,735

Per bucket per day, $0.0224 Mexican.

	Mexican.
Collection force:	
60 men with wagons	$60
126 cargadores	126
12 foremen	15
Total	201

$201÷6,000=$0.03350 Mexican per bucket.

	Mexican.
Barge landing:	
24 coolies	$24
27 laborers	27
Total	51

$51÷6,000=$0.0085 Mexican per bucket.

Casquitos:	Mexican.
8 patrones	$10
16 boatmen	16
Total	26

$26÷6,000=$0.0043 Mexican per bucket.

Barge:	Mexican.
1 patron	$2
8 laborers	8
Total	10

$10÷6,000=$0.0017 Mexican per bucket.

Launch:	Gold.
1 launch master	$1,000.00
1 engineer	360.00
1 assistant engineer	300.00
1 helmsman	360.00
2 firemen, at $240	480.00
3 sailors, at $120	360.00
Per year	2,860.00
Per month	238.333
Per day	7.836
Oil, waste, fuel, packing, etc., per day	5.00
Total per day	12.836

$12.836÷6,000=$0.00214 gold per bucket=$0.0049 Mexican per bucket.

[Additional charges per month.]

Renewal of buckets: $24,571.50÷2 years×12×6,000 buckets=$0.124 gold per bucket=$0.2806 Mexican per bucket.

$13 Mexican per installation; collect $2 on first month and $1 for each succeeding 11 months.

	Gold.
Cost of equipment	$106,000
Interest on investment, at 4 per cent	4,240

$4,240÷6,000=$0.7066 gold=$1.626 Mexican per year per bucket.

$1.626÷12=$0.1355 Mexican per month per bucket.

	Gold.
To be collected for sinking fund	106,000
Less for buckets and commodes	32,721
	73,279

$73,279÷4 years×12×6,000=$0.254 gold=$0.5766 Mexican.

Total set charge per bucket per month:

$0.2806
1.00 or $2
.1355
.5766

1.9927 Mexican after first month installed.

Recapitulation.

	Mexican.
Office	$0.0179
Corral	.0224
Collection	.0335
Barge landing	.0085
Barge	.0017
Launch	.0049
Casquitos	.0043
Per bucket per day	.0932

$0.0932×30=$2.796 per installation per month.

	Mexican.
Receipts for installation	$1
Renewals	.2806
Interest	.1355
Sinking fund	.5766
	1.9927

Total cost per installation per month, $4.79 Mexican.

An estimate for the quarter ending September 30, 1902, is hereby appended with the statement that it was approved as sent from this office, by the commission of public health:

ESTIMATE FOR QUARTER ENDING SEPTEMBER, 1902 (APPROPRIATION FOR PAIL SYSTEM).

Salaries and wages including—
1 superintendent of pail system, class 6.
2 clerks, class 9.
3 collectors, class 9.
3 overseers, class 9.
1 corral foreman, class 9.
1 overseer, excavators, class 9.
1 launch master, class 10.
1 blacksmith, class 10.
7 teamsters, class "B."
3 assistant overseers, class "G."
1 foreman, class "G."
8 foremen, class "I,"
1 engineer, class "H."
1 assistant engineer, class "I"
1 patron, class "H."
2 firemen, class "J."
3 sailors, class "K."
6 laborers, at $120, class "K."
133 laborers, at $220, class "K."

Total, $12,808.33.

Installation expenses, including office, bull-cart hire, repairs to pails, launch, barges, and vehicles, etc., the purchase of 28 horses, 10 ponies, 2 carretelas, 10 trucks, 4 carromatas, 6 pony harness, 4 heavy harness, forage, blacksmith supplies, harness supplies, launch, excavator parts already bought, 1 seagoing barge, 1 sea going tug.

Total, $58,132.

A total of $70,940.33 United States currency.

Considerable difficulty was experienced in obtaining the laborers willing to work at handling fecal matter at the rate of 40 cents gold daily, and it was found necessary for the public service to pay the laborers on this class of work 1 peso daily, and they have been hard to obtain at even this price. In the future it will probably be found necessary to pay banceros $1.20 Mexican each daily, as it has been found almost impossible to obtain efficient men at 1 peso.

A great deal of credit is due Mr. Osgood, assistant sanitary engineer, board of health, for his assistance in working out the details for the installation of the pail system since he was placed in the office by the board of health to supervise the work of installation and organization. The assistance of a competent engineer at this time was essential to the proper working out of the details.

Very respectfully,

B. H. BURRELL,
Superintendent.

EXHIBIT C.

REPORT OF THE ASSISTANT SANITARY ENGINEER.

MANILA, P. I., *June 30, 1902.*

The COMMISSIONER OF PUBLIC HEALTH,
Manila, P. I.

SIR: In accordance with instructions contained in your letter of June 4, 1902, I have the honor to submit the first annual report of the division of sanitary engineering in the office of the bureau of public health.

This division was established in the general organization of the bureau, and was put in practical operation on December 3, 1901. On that date I was appointed to the position of assistant sanitary engineer, the appointment being confirmed on December 7.

It was the intention to use my services only in the correction of the sanitary faults of those houses in which bubonic plague had occurred, but the enormous amount of work required of the board of health along all sanitary lines made it necessary almost at once that I help in other matters as well, so that the plague-infected houses became merely a special division of my duties.

It is found that the majority of the houses in the city of Manila are in faulty sanitary condition. The board of health has striven and is striving to remedy these faults, but the amount of work to be required is so great that it will be many years before it can be completed.

I need not call your attention to the many difficulties and limitations under which the work of this division has been carried on. In many instances its duties have encroached somewhat upon those of other departments. The conflicts have been on small details of jurisdiction, different interpretations of ordinances by different departments, and from lack of the customary municipal facilities in water supply and sewerage system, but up to the present time very little trouble has been found in coming to an agreement on these matters. As a whole, the work has moved along with very little friction.

By your order the work of this division was temporarily suspended from March 23 to June 1 on account of the outbreak of Asiatic cholera in Manila, in order that I might give my entire time, under the direction of the superintendent of government laboratories, to the organization and supervision of the distilled water supply for the city.

The sanitary status of Manila is wholly unlike that of any other large city under American control. We have an estimated population of 302,000 people, made up largely of those who are absolutely ignorant of the etiology of diseases and know nothing of the objects and importance of sanitary measures and precautions.

This class of people has been existing for centuries under conditions of environment and heredity exceedingly unfavorable to progressive evolution; the wonder is that they have not been exterminated by the many destructive epidemics that have visited them in the past. In face of these formidable conditions the progressive spirit of Americanism is slowly finding expression in various improvements, a general dissemination of knowledge, and better conditions from every standpoint. No better evidence in support of this statement is obtainable than the success of your bureau in dealing with such deadly diseases as bubonic plague and Asiatic cholera.

For the purpose of setting forth in a convenient form the work of this division I submit the following tabular statement and record of contracts:

	Inspections.	Buildings condemned.	Buildings vacated.	Closets improved.	Closets, sanitary, installed.	Courts improved.	Drains improved.	Floors, tile.	Floors, cement.	Partitions removed.	Pavements improved.	Vaults improved.	Walls removed.	Windows put in.	Orders referred to and acted upon by the board of health.
Walled City	798	6	4	60	4	50	48	42	25	25	153	21	2	9	32
Binondo	930	20	14	42	30	12	80	45	54	120	138	12	6	18	22
San Nicolas	93	3	2	30	18	9	24	24	9	12	24	9	2	12	4
Tondo	200	6	4	25		6	18	20	6	35	20	6	8	12	10
Santa Cruz	240	9	3	66	30	8	51	15	8	12	18	6	3	15	7
Quiapo	60	1			5		3	3			3				1
Sampaloc	10						3				2	1			
San Miguel	12				15										
Paco	15														8
Ermita	33						1					1			
Malate	3														
Pandacan															
Total	2,394	45	27	223	102	85	228	149	102	204	358	56	16	60	79

RECORD OF CONTRACTS.

San Lazaro detention camp.—(a) Eight buildings, (b) 6 buildings, (c) paving kitchen and laundry, (d) installing water supply, (e) plumbing, (f) grading.

San Lazaro hospital.—(a) Repair work (general), (b) plumbing repairs, (c) plumbing installation, (d) building.

Bubonic plague and smallpox hospital.—(a) Vaccine and virus station.

Pail system.—(a) Pails, (b) midden sheds.

PUBLIC AND PRIVATE CONTRACTS.

Several public and private contracts completed under the supervision of the division of sanitary engineering.

The tabular statement covers only the recorded work. In hundreds of cases minor defects have been remedied and directions given of which no record has been made.

Chinese, as a class, seem to be enemies of fresh air and sunlight, which they shut out by every conceivable method available to the ingenuity of their race. I have caused to be removed, and sometimes assisted to remove, many of these obstructions which have ranged from a piece of paper to a stone wall. It has been necessary to give my personal attention to this class of work in order to see that my instructions were not disregarded.

In addition to work on the private houses, the board of health has also undertaken a large amount of public work in buildings and repairs, such as the building of the San Lazaro detention camp, the bubonic plague and smallpox hospital, the vaccine and virus station, the leper colony on the island of Culion, a great deal of repair work and plumbing work at the San Lazaro Hospital, the installation of the pail system of sanitation, a prospective scheme of tenement houses, and many other undertakings less important individually but considerable in the aggregate, on which matters a very considerable portion of my time has been spent. As far as possible I have attempted to supervise the plumbing work done in the city and so bring it to a highers state of efficiency. This has proved to be a very difficult task owing to the utter ignorance of the general public and the fact that there are no plumbing regulations for the city.

This division has made a special study of the water supply and of the methods of handling the sewage of the city. In the confusion incidental to transferring the government from Spanish to American control, or in the work of organization under new conditions, many valuable maps and plans were lost or destroyed; therefore it is impossible to study or present these important matters in their complete details. In this connection I have the honor to invite your attention to my special report of January 9, 1902, on file in your office.

In conclusion I desire to thank you officially and personally for your support and cooperation to which must be ascribed all the credit for any success that has been attained by this division of the bureau of public health.

Respectfully submitted.

H. D. Osgood,
Assistant Sanitary Engineer.

Exhibit D.

REPORT OF THE CITY VETERINARIAN.

Manila, P. I., *June 30, 1902.*

Col. L. M. Maus, *Commissioner of Public Health.*

Sir: In compliance with your request I have the honor to submit the following report herewith concerning the veterinary department of the board of health, Manila, P. I., covering the period from August 7, 1901, to June 30, 1902, inclusive, consisting of the inspection of all animals shipped into the city of Manila, condemnation and destruction of animals affected with contagious diseases, disinfection of stables where diseases of this nature appear, and the inspection of meat for food purposes slaughtered at the public matadero.

Owing to the almost complete destruction of the cattle herds on the different islands of the Philippine group from the fatal disease rinderpest, the cattle dealers of Manila have been forced to ship cattle from foreign markets to supply the wants of Manila.

The Hongkong cattle market has furnished the greater portion of cattle during the past fiscal year. The passenger and freight steamers bring on an average some 150 head of cattle each trip. None of these vessels have any substantial or permanent fixtures in the way of stalls for the safe and humane transportation of cattle in rough weather, but, on the contrary, the shippers of cattle are obligated to furnish their own accommodations in the shape of stalls, which consist of the separation of the animals by means of bamboo poles about 1½ inches average diameter, fastened together with rattan strips.

These excuses for stalls serve their purpose, provided there is no rough weather en voyage, but in a moderately rough sea they are easily carried away, leaving the animals an easy prey to the action of the vessel, and exposed to the sharp ends of the bamboo poles.

All the shipments from Hongkong have arrived in a healthy condition with the exception of three affected with foot and mouth disease (Aphtous fever), which were immediately placed in quarantine and subjected to treatment.

The class of animals shipped from Hongkong, while not very large, is a far superior grade to the native Filipino cattle, producing a much better and sweeter quality of beef.

Singapore has also furnished a considerable number of cattle for the Manila meat market during the last fiscal year, some of which were originally shipped from Siam, and some from the island of Java; then transshipped to Manila. There have been four shipments affected slightly with Aphtous fever, but aside from this the cattle have been received in a healthy condition.

The majority of steamers engaged in the interisland trade bring stock to the city of Manila, but none of these vessels is properly equipped for this purpose. Animals are received after the steamers are loaded with merchandise, carried on the upper decks and made fast by their heads to the railing around the deck, where, from the action of the vessel, in a moderately rough sea, they experience great difficulty in keeping their feet on the slippery, uncleated decks.

With the exception of some 150 hogs shipped from China, the supply for the Manila market has been drawn from the island of Luzon almost exclusively.

During the last fiscal year 25 hogs affected with hog cholera have been cremated in the matadero crematory, the first 4 cases being noticed on the night of the 25th of March, 1902. All the post-mortem lesions were conclusive, comparing diagnostically with those found in hogs affected with this disease in the United States. In order to make the diagnosis certain, 3 of the cadavers were sent to the biological laboratory, where microscopical examination and cultures made by Dr. Strong proved conclusively the existence of hog cholera among swine on these islands. Endeavors have been made by this department to locate the districts in which this disease is prevalent, but up to the present time our investigations have been unsuccessful, with the exception of one location.

Mr. Barton, an American, who lives at San Juan del Monte and is experimenting with the raising of hogs, reported his animals dying. He also informed me that he was feeding them with refuse collected from the hotels of Manila. He brought one dead animal into the laboratory for post-mortem examination, which revealed the fact that hog cholera existed in that district. He has thoroughly cleaned and disinfected his corrals and feeding troughs and informs me that his animals are in a heathy condition at the present time.

Considerable Cysticercus cellulosa is found in hogs slaughtered at the public matadero. The entire carcasses of those infected are cremated for the reason that this parasite causes the Taenia solium of man. The majority of the cases come from the province of Batangas, Luzon.

In compliance with ordinance No. 6, there have been inspected in the city of Manila by the veterinary department during the last fiscal year 191 stables containing 1,500 head of horses, in which 40 horses were found affected with glanders, all of which were killed and were destroyed in the public crematories, the different stables thoroughly disinfected, and subsequent inspections made of the animals therein stabled.

The large stables connected with the different hotels of the city of Manila, as well as the livery barns, are kept in good sanitary condition. Those stables which are used for stabling animals used for public conveyances are generally situated in the outlying districts of the city, and owing to the low-lying nature of the land on which they are constructed are with difficulty kept in a good sanitary condition.

One of the great difficulties encountered by the veterinary department in policing animals affected with glanders is that they are usually owned by the Filipinos, who are not acquainted with the contagious nature of this disease, and who either secrete them or send them into the country to effect a cure, which has aided materially in spreading the disease so generally over the islands.

Surra made its appearance among horses in the city of Manila in October, 1901, shortly after Government animals had been shipped from the China campaign, where horses from many parts of the world were brought for the usages of warfare. Whether or not these animals conveyed the parasite which causes surra it is impossible to ascertain. No statistics are obtainable that this disease had existed on these islands prior to the year 1901.

This department has made quite extensive experimentation, endeavoring to find a specific treatment for this disease, but up to the present time the percentage of recoveries reported by veterinarians located in different parts of the islands is probably not more than 1½ per cent of the animals affected.

The matadero is inspected by a native practicante, who is directly under the supervision of the veterinarians of the board of health. This inspection follows the rules and regulations of the Bureau of Animal Industry of the United States as far as practicable. The matadero is located on the bay front, in the Tondo district, and is the only public abattoir in Manila. It is well adapted to the purpose, but needs many improvements to make it a modern plant. The methods of killing and dressing are peculiar to the islands.

Many changes have been made in the inspection and killing of animals, and when the contemplated alterations have been introduced the matadero will compare more than favorably with such public institutions in other countries.

Number of cattle received.

Provincial:		
Island of Marinduque	701	
Island of Leyte	55	
Island of Luzon	802	
Island of Cebu	937	
Islands of Dalupiri and Fuga	843	
Island of Romblon	168	
Island of Masbate	79	
Island of Calamianes	137	
Island of Panay	763	
Island of Batan	171	
Island of Bohol	30	
Island of Mindanao	98	
Island of Mindoro	134	
		4,918
Foreign:		
Singapore	4,471	
Hongkong	8,627	
Saigon	196	
Spain	3	
Australia	13	
Shanghai	149	
Japan	243	
		13,702
		18,620

Animals inspected from August 7, 1901, to June 30, 1902.

Date.	Cattle.	Horses.	Carabaos.	Hogs.	Sheep.	Goats.	Other animals.
1901.							
August	764	261	46	3,045	37	55	....
September	1,096	294	69	4,024	7	30	3
October	2,012	330	164	4,304	3	17	1
November	1,673	405	48	4,758	3	14	5
December	1,263	328	82	5,082	50	31	4
1902.							
January	2,279	250	82	4,436	7	15	12
February	1,828	432	35	4,058	5	17	4
March	1,689	382	89	4,946	11	17	10
April	1,271	233	51	4,163	9	7	3
May	1,439	262	24	4,015	1	4	6
	15,314	3,177	690	42,831	133	207	48
June	3,316	271	99	3,480	102	42	....
	18,620	3,448	789	46,311	235	249	48

Animals inspected from August 7, 1901, to June 30, 1902—Continued.

	Slaughtered in matadero.			Condemned and cremated.	
	Cattle.	Hogs.	Sheep.	Cattle.	Hogs.
August (7th)	1,170	3,772	....	1	62
September	1,588	4,755	....	....	72
October	1,010	4,856	....	....	56
November	1,574	4,931	....	3	58
December	1,375	5,476	30	7	39
January	1,650	5,029	9	17	23
February	1,624	4,607	1	8	15
March	1,574	5,116	1	2	17
April	1,325	5,054	6	11	33
May	1,290	5,092	....	....	58
June	1,606	4,517	....	15	82
Total	15,786	53,205	47	59	455

CONDEMNED AND CREMATED.

Hogs cremated for Cisticercus cellulosa	333
Hogs cremated for cholera	36
Hogs cremated for peritonitis	1
Hogs found dead in corral	85
Total	455
Cattle cremated, dead from heat, exhaustion, and injuries in transportation	40
Cattle cremated, anæmic	7
Cattle condemned and cremated, peritonitis	3
Cattle condemned and cremated, contusions	9
Total	59

Very respectfully,

W. W. Richards,
City Veterinarian.

Exhibit E.

REPORT OF THE SANTIAGO CHOLERA HOSPITAL FROM APRIL 27 TO JUNE 17, 1902.

Office of the Santiago Cholera Hospital,
Manila, P. I., July 2, 1902.

To the Commissioner of Public Health for the Philippine Islands.

Sir: I have the honor to make the following report of the work done at the Santiago cholera hospital from April 27, 1902, to June 17, 1902, inclusive, embodying the treatment of the cases and the therapeutic value of certain drugs as collated from the various case histories on file in this office.

During this period there were 359 admissions, of which number 5 were, at June 17, still under treatment. Of the remainder (354), 30 cases, with 8 deaths, are discounted as being not cholera, based on the pathological laboratory reports of the examinations of the stools, 277 died, and 49 were convalescent or had been discharged cured from the hospital. Of this number (354), 262 were males and 92 females. But one case under 3 years of age was admitted; this was a case of cholera asiatica and was observed in the detention camp within a few hours after its admission to that part of the institution. Cases were assigned indiscriminately, except that women, foreigners, and Americans had their separate wards.

A fixed treatment was carried out in each case, so long as it was believed to be to the welfare of the patient.

In a large number of cases the only treatment that has proved of value has been the symptomatic and expectant one, endeavoring to maintain the patient's strength and to render the intestinal canal as aseptic as possible, thus minimizing a further generation of the toxines. In this connection it is worthy of note that benzozone has a distinct germicidal action on the cholera vibrio, a solution of 1 in 2,940, killing the germ in less than a minute.

When a patient upon admission was not in a moribund state, as a result of the virulent toxemia incident to cholera, but in the second stage or state of collapse, it has been the practice among the attending physicians to resort to the subcutaneous injection of normal physiological saline solution, one-half liter, combined with a like amount of sterile benzozone solution 1:1,000 strength. The point selected for the injection was usually the breast. It was observed that the stimulating effect of the saline and benzozone combined solution was more prompt and lasting than that of the saline solution alone.

The combination acted as a decided stimulant to the circulatory system, increasing the volume and force of the blood current.

Upon the respiratory system the drug acts as a stimulant. No marked effect was noted of the drug's action upon the nervous system.

Capsules doubly coated with celloidin, and containing 2½ grains of benzozone, were found to pass through the small intestines undissolved. In some instances the capsules were recovered from the feces, minus about 2 grains of the drug distributed along the canal by virtue of osmosis. High rectal enemas of benzozone in strength of 1-2000 were given in a large proportion of the cases.

No ill effects were noted from this method of administration of the drug except that of nervous excitement incident to the passage of the tube, and this only in a few cases. Two and one-half per cent of the cases of cholera treated in this hospital presented evidence of intestinal hemorrhages at the time of admission. The blood passed was usually very slight in amount, and it has not been observed that the drug in anyway influenced the amount or gross appearance of the hemorrhagic stools, save by purely physical action in furnishing a medium to flush out the large bowel and rectum of toxine-saturated fecal matter.

The lavage of the large bowel was in many instances followed by a decided sense of relief to the patient from tenesmus and cramps, so much so that refreshing sleep followed the operations.

Ordinarily the cerebral symptoms produced by the subcutaneous rectal or gastric administration of benzozone are not marked. It should be noted, however, that the restless semidelirium observed in a large percentage of cholera patients was invariably lessened by the rectal injection of warm saline solution. Benzozone may be classed as a mild antispasmodic as well as a powerful germicide.

The often repeated use of alcohol as a stimulant was discontinued in many instances inasmuch as it was observed that mental, physical, and emotional excitement was followed by a grave reaction incident to its use. The careful administration of strychniæ hydrochloras was prescribed in most cases of collapse, accompanied by such physical measures as a hot bath, hot-water bottles, etc. Atropine was relied upon to give relief in cases of sudden collapse. The value of alcohol as a tonic, especially in the form of sherry and malaga wine, was demonstrated in the stage of convalescence.

A number of patients who survived the stage of collapse and were apparently undergoing favorable reaction from the toxemia were again stricken down by a severe diarrhea, dying from the relapse.

By reference to Table A, copy of which is attached, there will be noted the result of the various treatments undergone by the patients, with the totals and percentages of deaths, both before and after six hours, and the recoveries under the various treatments. From this it will be seen that cases treated with benzozone alone or by a guiacol carbonate and calomel show equal percentages of recoveries on the total cases treated by each method, but as only a comparatively few cases (19) have been treated with the latter, and those only among the women, the cases under benzozone treatment show a better percentage than those under guiacol, owing to the fact that the proportion of recoveries among the women is larger than that among the men at this hospital. Under benzozone 26.41 per cent women to 18.98 per cent men recovered. Of the treatment of cholera by the guiacol carbonate and calomel method the following notes will cover the observations made by those physicians who have used the combination in their wards:

1. Guiacol carbonate and calomel are well borne by the stomach, allaying vomiting even in most stubborn cases. 2. The combination given in doses of one-tenth grain calomel and 3 grains guiacol carbonate in powder every four to six hours markedly lessened the number of bowel movements. The drugs thus acted as a good astringent antiseptic.

Upon the circulatory, respiratory, and nervous systems they seemed to have little or no effect in small doses, except that in a few instances it was noted that a slight reduction of temperature occurred. With but one exception all cases treated by chloridyne, tannic and sulphuric acid, and potassium permanganate, etc., died.

A large number of the cases exceeded the six-hour mark, owing to the situation of the hospital, to prompt attention to the sick on arrival, and to careful ambulance service en route, although it was apparent that many of the cases were hopeless from the time of admission.

The high mortality from cholera in the cases treated is caused by several factors, viz: The length of time which elapsed before the patient was brought into the hospital; the emaciated condition of many of the cases that came from the poorest class; the antipathy, inherent in the Malay race, to any drug or treatment not oriental; and to the fact that the mortality is always greater in the first few months of an epidemic than in the later stage or in the stage of decline. Further, 25 per cent of the cases treated were either under 12 years or over 40 years, and these show a larger death rate by 10 to 15 per cent than the cases between 12 and 40 years.

Great difficulty was experienced in eliciting information from the patients owing to their physical condition on admission, and but little dependence could be placed on the history supplied on the transfer slip. For these reasons little information has been gained as to the ætiology of the disease in this city. The larger portion of the cases have come from the low-lying districts, particularly from such parts as are penetrated by esteros. This, with overcrowding and unhygienic conditions, has done much to increase the prevalence of cholera.

Every effort has been made to obtain information as to the source of infection of every patient. The causes attributed have been infected drinking water, infected food, probably so infected by means of flies or through vessels being washed in infected water from esteros.

Pettenkofer maintains that the conditions of the soil are of the greatest importance, particularly a certain porosity combined with moisture and contamination with organic matter such as sewerage. He holds that the germ develops in the subsoil moisture during the warm months and rises into the atmosphere as a miasma. Note the relation of the rise in the cholera to increasing humidity, except from May 24 to June 8, when the inspections were being reduced in number and patients being treated in their homes without being reported to the board of health, in violation of the health ordinances.

A large proportion of American and European patients treated here were intemperate livers, were debilitated from want of proper food, and they were invariably taken from unwholesome surroundings in which they had spent the period of incubation and the first or diarrhea stage of the disease proper.

Many changes in the personnel of the medical staff, made imperative by the need in other fields of work, acted in a way detrimental to the service of the hospital. After much trial of service an able corps of nurses and an office staff was obtained which rendered faithful and efficient services. A certain number of Sisters of Charity were attached to the nursing staff, and they in their department rendered excellent service. Owing to the careful observance of all the rules drafted for the protection of the staff, there have been no cases of cholera among the medical, office, or nursing staff.

Chinese laundrymen, who have been brought into close contact with the linen of all patients, have been exempt from cholera.

Requisitions, both to the board of health and to the government laboratories, for such things as were necessary for the treatment of the cases, have been promptly filled. Inclosed I have the honor to send you list of cases under various treatments, showing total cases, deaths under six hours, six to twelve, twelve to eighteen, and over eighteen hours, and recoveries, with percentages of deaths under and over six hours, and recoveries to cases, copy of weekly report of cases and percentages as supplied to the board of health, copy of order relating to benzozone, and copy of cholera curve, together with temperature, humidity, and rainfall for the period from the outbreak of the cholera to June 30, 1902.

Very respectfully,

Edward A. Southall,
Captain and Assistant Surgeon, U. S. Vols.

A schedule showing the number of cases admitted, deaths and percentages of deaths to cases at under 1 year, 1 to 12 years, 12 to 21 years, 21 to 40 years, and over 40 years, with analysis of deaths occurring under 3 hours, between 3 and 6 hours, 6 and 9 hours, 9 and 12 hours, 12 and 18 hours, and over 18 hours, from 4 p. m., 27th of April, 1902, to 4 p. m., May 10, 1902:

Years.	Cases.	Under 3 hours.		Between 3 and 6.		Between 6 and 9.		Between 9 and 12.		Between 12 and 18.		Over 18 hours.		Total.	
		Deaths.	Percent.	Deaths.	Percent.	Deaths.	Percent.	Deaths.	Percent.	Deaths.	Percent.	Deaths.	Percent.	Deaths.	Percent.
Under 1	....	....	......	....	......	....	......	....	......	....	......	....	......	....	......
1 to 12	5	2	40.00	....	......	....	......	....	......	....	......	3	60.00	5	100.00
12 to 21	31	3	9.68	5	16.13	2	6.46	5	16.13	1	3.23	9	29.01	25	80.64
21 to 40	85	11	12.94	12	14.12	6	7.06	3	3.53	6	7.06	24	28.23	62	72.94
Over 40	25	4	16.00	6	24.00	3	12.00	3	12.00	3	12.00	3	12.00	22	88.00
Total	146	20	13.70	23	15.25	11	7.53	11	7.53	10	6.85	39	26.71	114	78.07
		29.45				48.62									
		78.07													

A schedule showing the number of cases admitted, deaths, and percentages of deaths to cases at under 1 year, 1 to 12 years, 12 to 21 years, 21 to 40 years, and over 40 years, with analysis of deaths occurring under 3 hours, between 3 and 6 hours, 6 and 9 hours, 9 and 12 hours, 12 and 18 hours, and over 18 hours, from 4 p. m., 27th day of April, 1902, to 4 p. m., May 24, 1902:

Years.	Cases.	Under 3 hours.		Between 3 and 6.		Between 6 and 9.		Between 9 and 12.		Between 12 and 18.		Over 18 hours.		Total.	
		Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.
Under 1	....	....	......	....	......	....	......	....	......	....	......	....	......	....	......
1 to 12	11	2	18.18	2	18.18	....	......	....	......	....	......	3	27.27	7	63.63
12 to 21	44	3	6.81	7	15.91	4	9.09	7	15.91	2	4.54	9	20.45	32	72.71
21 to 40	121	14	11.57	16	13.22	10	8.27	4	3.31	10	8.27	36	29.74	90	74.35
Over 40	47	8	17.02	10	21.27	6	12.77	3	6.39	5	10.63	4	8.51	36	76.59
Total	223	27	12.11	35	15.69	20	8.99	14	6.27	17	7.62	52	23.32	165	74.00
		27.80				46.20									
		74.00													

A schedule showing the number of cases admitted, deaths and percentages of deaths to cases at under 1 year, 1 to 12 years, 12 to 21 years, 21 to 40 years, and over 40 years, with analysis of deaths occurring under 3 hours, between 3 and 6 hours, 6 and 9 hours, 9 and 12 hours, 12 and 18 hours, and over 18 hours, from 4 p. m., 27th of April, 1902, to 4 p. m., 24th of May, 1902:

Years.	Cases.	Under 3 hours.		Between 3 and 6.		Between 6 and 9.		Between 9 and 12.		Between 12 and 18.		Over 18 hours.		Total.	
		Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.
Under 1	....	....	......	....	......	....	......	....	......	....	......	....	......	....	......
1 to 12	12	2	16.66	2	16.66	....	......	....	......	2	16.66	5	41.68	11	91.66
12 to 21	50	3	6.00	7	14.00	5	10.00	7	14.00	2	4.00	14	28.00	38	76.00
21 to 40	138	16	11.59	17	12.32	10	7.24	6	4.35	13	9.42	41	29.71	103	74.63
Over 40	57	10	17.54	11	19.29	7	12.28	6	10.53	8	14.04	7	12.28	49	85.96
Total	257	31	12.06	37	14.40	22	8.56	19	7.40	25	9.72	67	26.07	201	78.21
		26.46						51.75							
		78.21													

A schedule showing the number of cases admitted, deaths, and percentages of deaths to cases at under 1 year, 1 to 12 years, 12 to 21 years, 21 to 40 years, and over 40 years, with analysis of deaths occurring under 3 hours, between 3 and 6 hours, 6 and 9 hours, 9 and 12 hours, 12 and 18 hours, and over 18 hours, from 4 p. m. 27th day of April, 1902, to 4 p. m. May 31, 1902:

Years.		Under 3 hours.		Between 3 and 6.		Between 6 and 9.		Between 9 and 12.		Between 12 and 18.		Over 18 hours.		Total.	
	Cases.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.
Under 1	....	....	......	....	......	....	......	....	......	....	......	....	......	....	......
1 to 12	12	2	16.67	2	16.67	....	......	....	......	2	16.66	6	50.00	12	100.00
12 to 21	54	3	5.55	7	12.96	5	9.26	7	12.96	3	5.55	17	31.49	42	77.77
21 to 40	150	16	10.39	20	13.00	13	8.44	7	4.55	14	9.09	47	30.52	117	75.97
Over 40	64	12	18.75	13	20.31	8	12.50	7	10.94	8	12.50	7	10.94	55	85.94
Total	284	33	11.62	42	14.80	26	9.15	21	7.40	27	9.56	77	29.11	226	79.58
		26.42				53.16									
		79.58													

A schedule showing the number of cases admitted, deaths and percentages of deaths to cases at under 1 year, 1 to 12 years, 12 to 21 years, 21 to 40 years, and over 40 years, with analysis of deaths occurring under 3 hours, between 3 and 6 hours, 6 and 9 hours, 9 and 12 hours, 12 and 18 hours, and over 18 hours, from 4 p. m. 27th of April, 1902, to 4 p. m., June 3, 1902:

Years.		Under 3 hours.		Between 3 and 6.		Between 6 and 9.		Between 9 and 12.		Between 12 and 18.		Over 18 hours.		Total.	
	Cases.	Deaths.	Per cent.	Deaths.	Percent.	Deaths.	Percent.	Deaths.	Percent.	Deaths.	Percent.	Deaths.	Percent.	Deaths.	Percent.
Under 1	....	....	......	....	......	....	......	....	......	....	......	....	......	....	......
1 to 12	1	....	......	....	......	....	......	....	......	....	......	1	100.00	1	100.00
12 to 21	21	3	14.29	2	9.52	2	9.52	3	14.29	1	4.77	8	38.48	19	90.87
21 to 40	51	5	9.81	7	13.72	3	5.88	3	5.88	5	9.81	7	13.72	30	58.82
Over 40	15	4	26.67	3	20.00	....	......	....	......	2	13.33	2	13.33	11	73.33
Total	88	12	13.64	12	13.64	5	5.68	6	6.82	8	9.09	18	20.45	61	69.32
		27.28.				42.04.									
		69.32.													

A schedule showing the number of cases admitted, deaths and percentages of deaths to cases at under one year, 1 to 12 years, 12 to 21 years, 21 to 40 years, and over 40 years, with analysis of deaths occurring under 3 hours, between 3 and 6 hours, 6 and 9 hours, 9 and 12 hours, 12 and 18 hours, and over 18 hours, from 4 p. m., 27th day of April, 1902, to 4 p. m., June 7, 1902:

Years.		Under 3 hours.		Between 3 and 6.		Between 6 and 9.		Between 9 and 12.		Between 12 and 18.		Over 18 hours.		Total.	
	Cases.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.
Under 1	....	....	......	....	......	....	......	....	......	....	......	....	......	....	......
1 to 12	13	2	15.38	2	15.38	....	......	....	......	2	15.38	7	53.86	13	100.00
12 to 21	59	4	6.80	10	16.94	5	8.47	7	11.87	3	5.09	18	30.51	47	79.68
21 to 40	168	18	10.71	21	12.50	14	8.33	7	4.17	14	8.33	51	30.36	125	74.40
Over 40	71	12	16.90	14	19.72	8	11.27	8	11.27	11	15.48	7	9.86	60	84.50
Total	311	36	11.58	47	15.11	27	8.68	22	7.07	30	9.64	83	26.70	245	78.78
		26.69				52.09									
		78.78													

A schedule showing the number of cases admitted, deaths and percentages of deaths to cases at under 1 year, 1 to 12 years, 12 to 21 years, 21 to 40 years, and over 40 years, with analysis of deaths occurring under 3 hours, between 3 and 6 hours, 6 and 9 hours, 9 and 12 hours, 12 and 18 hours, and over 18 hours, from 4 p. m., 27th day of April, 1902, to 4 p. m., June 14, 1902:

Years.	Cases.	Under 3 hours.		Between 3 and 6.		Between 6 and 9.		Between 9 and 12.		Between 12 and 18.		Over 18 hours.		Total.	
		Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.
Under 1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1 to 12	16	2	12.50	2	12.50	....	....	....	....	2	12.50	7	43.75	13	81.25
12 to 21	63	4	6.35	10	15.88	6	9.52	7	11.11	3	4.76	18	28.57	48	76.19
21 to 40	177	19	10.74	21	11.86	14	7.91	8	4.52	14	7.91	56	31.64	132	74.58
Over 40	82	12	14.63	15	18.30	10	12.20	9	10.98	17	20.73	8	9.75	71	86.59
Total	338	37	10.95	48	14.20	30	8.87	24	7.10	36	10.65	89	26.33	264	78.10
		25.15				52.95									
		78.10													

A schedule showing the number of cases admitted, deaths and percentages of deaths to cases at under 1 year, 1 to 12 years, 12 to 21 years, 21 to 40 years, and over 40 years, with analysis of deaths occurring under 3 hours, between 3 and 6 hours, 6 and 8 hours, 9 and 12 hours, 12 and 18 hours, and over 18 hours, from 4 p. m., 27th of April, 1902, to 4 p. m., June 21, 1902:

Years.	Cases.	Under 3 hours.		Between 3 and 6.		Between 6 and 9.		Between 9 and 12.		Between 12 and 18.		Over 18 hours.		Total.	
		Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.
Under 1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1 to 12	22	2	9.09	3	13.64	2	9.09	....	....	2	9.09	9	40.90	18	81.81
12 to 21	73	4	5.48	14	19.18	6	8.22	7	9.59	5	6.85	20	27.39	56	76.72
21 to 40	217	26	11.98	24	11.06	15	6.91	9	4.15	23	10.60	60	27.65	157	72.35
Over 40	93	13	13.98	18	19.35	11	11.83	9	9.68	19	20.43	10	10.75	80	86.02
Total	405	45	11.11	59	14.57	34	8.40	25	6.17	49	12.10	99	24.44	311	76.79
	25.68					51.11									
	76.79														

BENZOZONE.

Ages.	Cases.	Died under 6 hours.	Died between 6 and 12 hours.	Died between 12 and 18 hours.	Over 18 hours.	Recoveries.	Total cases.	Died under 6 hours.	Died over 6 hours.	Recoveries.	Percentages of deaths under 6 hours.	Percentages of deaths over 6 hours.	Percentages of recoveries.
1-12	5	....	....	1	4	....	......	....	......	....	....	....	....
12-21	39	8	9	2	11	9	......	....	......	....	....	....	....
21-40	98	13	16	12	32	25	......	....	......	....	....	....	....
Over 40	48	13	11	10	8	6	190	34	116	40	17.89	61.06	21.05

36=18.95; 25=13.16; 55=28.95.

BENZOZONE, WITH DRUGS, OTHER THAN GUIACOL.

1-12	2	....	....	....	2	....	......	....	......	....	....	....	....
12-21	7	1	....	....	6	....	......	....	......	....	....	....	....
21-40	16	1	1	1	11	2	......	....	......	....	....	....	....
Over 40	6	1	3	1	....	1	31	35	25	3	9.68	80.64	9.68

4=12.90; 2=6.45; 19=61.29.

GUIACOL AND CALOMEL.

Ages.	Cases.	Died under 6 hours.	Died between 6 and 12 hours.	Died between 12 and 18 hours.	Over 18 hours.	Recoveries.	Total cases.	Died under 6 hours.	Died over 6 hours.	Recoveries.	Percentages of deaths under 6 hours.	Percentages of deaths over 6 hours.	Percentages of recoveries.
1-12	2	....	1	....	1	....	......	....	......	....	....	....	....
12-21	4	1	....	1	....	2	......	....	......	....	....	....	....
21-40	10	4	1	1	2	2	......	....	......	....	....	....	....
Over 40	3	....	1	2	....	....	19	5	10	4	26.32	52.63	21.05

3=15.79; 4=21.05; 3=15.79.

GUIACOL AND BENZOZONE.

1-12	....	....	....	....	....	....	......	....	......	....	....	....	....
12-21	2	....	....	1	1	....	......	....	......	....	....	....	....
21-40	3	....	....	....	2	1	......	....	......	....	....	....	....
Over 40	....	....	....	....	....	....	5	....	4	1	....	80.00	20.00

1=20; 3=60.

OTHER TREATMENTS.

1-12	5	4	....	1	....	....	......	....	......	....	....	....	....
12-21	13	8	3	....	2	....	......	....	......	....	....	....	....
21-40	42	26	8	4	3	1	......	....	......	....	....	....	....
Over 40	19	12	4	2	1	....	79	50	28	1	63.29	35.45	1.26
	....	....	....	....	....	....	324	92	183	49	28.39	56.39	15.12
Convalescents from other hospitals (2) and cases not cholera	....	....	....	....	....	....	30	3	5	22	....	....	....
From April 27, 1902, to June 17, 1902, excluding cases (5) still under treatment in hospital	....	....	....	....	....	....	354	95	188	71	....	....	....

15=18.99; 7=8.86; 6=7.60.

EXHIBIT F.

REPORT OF THE SANTIAGO CHOLERA HOSPITAL FROM JUNE 17 TO JULY 31, 1902.

SANTIAGO CHOLERA HOSPITAL, *September 10, 1902.*

THE COMMISSIONER OF PUBLIC HEALTH FOR THE PHILIPPINES.

SIR: I have the honor to submit to you, as per request, the following report of the work done at the Santiago cholera hospital from the 17th day of June to the 31st day of July, 1902. In this report I do not include any of the work previously done by the hospital, as this has been very completely covered by the former report of Dr. E. A. Southwell on his withdrawal from the hospital on June 17, this report showing the treatment of cases and the relative values of the different treatments as obtained from the class histories on file in this office.

During the period covered by the inclosed report there were 514 patients admitted, of which number there were yet 11 patients remaining in the hospital on the 31st of July.

Of the 514 cases admitted, 9 of the number were found by bacteriological examination, as well as from clinical symptoms, to be not cholera. As has been noted in the preceding reports, the general class of patients admitted in the cholera hospital are difficult to treat, for the following reasons:

First. The aversion which so many of the natives have to the American doctors' plan of treatment, it being so different in many respects from that used by the native physicians, this aversion being so marked in many instances as to necessitate the use of force in the administering of medicine.

Second. The bad sanitary conditions in which most of the people have been living, and the poor food to which they have been accustomed, these factors producing such a low state of vitality that the system was unable to react from the effects of the toxine produced by the cholera organism.

Third. One very important factor in increasing the mortality percentage of this hospital was dread of the detention camp. This factor (the detention camp) has been done away with, by not removing contacts to a detention camp, but by quarantining them in their homes after disinfecting the premises. The many scare-head reports of the treatment of patients in the hospital have also been of hindrance in the work, but these have been somewhat counteracted by the convalescents from the hospitals appearing among their friends and giving a true version of the treatment received. One marked instance of this is the case of a native, who, when being taken with a second attack of cholera, telephoned for an ambulance to take him to the hospital.

Fourth. The condition of the patient on admittance to the hospital. In many cases the patient, though in a state of collapse at the time he was found, received no stimulation until his arrival at the hospital, this interval sometimes amounting to two or three hours, and combining with the exhaustion produced by the ride in the ambulance over rough streets, to decrease his chance of recovery.

The foregoing causes, I believe, have materially increased our mortality percentage over what it otherwise would have been had we been dealing with a more intelligent class of people. This of course does not include all the patients admitted to the hospital, as many were of the most intelligent class, but it may be considered as true regarding the great majority of patients treated.

It is to be noted that for a time, owing to a shortage of benzozone, very few cases were treated with the benzozone alone; in the majority of cases benzozone solution being used in enemas in connection with other treatments. In some cases no special line of treatment was followed out, the patients being treated symptomatically, as deemed advisable. In the wards under the control of native physicians an entirely different plan of treatment has been followed, which in this report is placed under the head of "mixed treatment."

The lowering of the mortality in this hospital is largely due to the devotion to duty of, and the high standard of the work performed by, the physicians comprising the staff of the hospital. Too much credit can not be given the "Sisters" for the untiring work they have performed in the various wards of the hospital and particularly in the two female wards, as well as in the preparing of the food for the native convalescents; nor should the valuable work be forgotten which was done by the clerks in the office and the nurses in the wards, through whose strict attention to duty we are enabled to obtain the results hereafter noted.

The diagnoses of all cases entering this hospital were based upon the bacteriological examinations of the stools. It might be mentioned parenthetically that no cases of cholera have developed as yet among the employees of the institution. The absence of the disease from among the employees is possibly, and quite probably, due to their frequently taking the benzozone capsules as a prophylactic.

During the month of July beriberi made its appearance in the male Filipino convalescent ward, three cases occurring within twenty-four hours of each other. These cases were immediately segregated, the other patients removed from the ward, and the ward thoroughly disinfected with bichloride solution, after which there was no further appearance of the disease.

Since the establishment of this hospital the most rigid sanitary regulations have been enforced. For the disposal of the excrement, closed pails are placed at the door of each ward in which the feces are poured, after which the pans are thoroughly disinfected by immersion in a 1 to 3,000 solution of bichloride of mercury, The feces are then transported to a vault some distance from the hospital, into which they are emptied, and at regular intervals during the day are covered with bichloride of lime, care being taken at all times not to allow the feces to remain uncovered long enough to attract flies.

In cases of death, the bodies are placed in a closed room adjacent to the hospital. They are then covered with sheets which have just been wrung out of a 5 per cent solution of carbolic acid to prevent the attraction of flies. Within a few hours after death the bodies are removed to the morgue at San Lazaro, where, if not claimed for burial by friends or relatives, they are cremated.

Appended to this report I submit to you a tabulated statement showing the number of cases admitted to the hospital from the day of opening, April 27, until the 31st of July, 1902, in which is shown a record of patients to whom have been given the different treatments used in this hospital and the relative results obtained therefrom.

Respectfully,

H. A. LINDLEY,
Physician in Charge.

SANTIAGO CHOLERA HOSPITAL, *September 11, 1902.*

Patients treated at hospital up to July 31, 1902.

Total patients admitted	873
Patients in hospital July 31	71
Total	802

	Number.	Per cent.
Cases discharged	217	27.05
Deaths	555	69.20
Not cholera	30	3.86
Total	802	----------

BENZOYL-ACETYL-PEROXIDE TREATMENT.

Deaths under six hours	49	15.50
Deaths over six hours	172	54.43
Recoveries	95	30.06
Total	316	----------

BENZOYL-ACETYL-PEROXIDE WITH GUIACOL CARBONATE AND CALOMEL.

Deaths under six hours	11	4.38
Deaths over six hours	137	54.58
Recoveries	103	41.03
Total	251	----------

GUIACOL CARBONATE AND CALOMEL TREATMENT.

Deaths under six hours	18	27.27
Deaths over six hours	38	57.57
Recoveries	10	15.15
Total	66	----------

MIXED TREATMENT.

Deaths under six hours	66	39.05
Deaths over six hours	64	37.87
Recoveries	9	5.32
Not cholera	30	17.75
Total	169	----------

APPENDIX B.

REPORT OF DR. FRANK S. BOURNS, COMMISSIONER OF PUBLIC HEALTH, FOR THE MONTH OF AUGUST, 1902.

DEPARTMENT OF THE INTERIOR,
BUREAU OF PUBLIC HEALTH FOR PHILIPPINES,
OFFICE OF THE COMMISSIONER,
Manila, September 8, 1902.

The SECRETARY OF THE INTERIOR, *Manila, P. I.*

SIR: In reply to your request for report on the work of the board of health for the month of August, 1902, to complete the annual report on the work of the board, I have the honor to submit the following:

It will be seen that the statistics from the provinces are meager, as but few reports have been received and the information contained therein is made up almost entirely from telegraphic reports at this office and covers only the cholera situation.

The table showing the time when cholera first appeared in the various provinces gives a good idea of the gradual spread of the disease throughout the islands.

At the beginning of August the disease was at its height in the provinces of Union, Ilocos Sur, and Ilocos Norte. A medical officer was immediately detailed to this region and has remained there up to the present time.

Cebu, where the disease appeared about the middle of July, suffered severely for about four weeks, when a marked decline began, and now but few cases are occurring there.

The appearance of the disease in Negros and Panay had been expected for some time. It is, unfortunately, at this writing (September 8) very severe, especially in Iloilo and the surrounding country. A medical officer from this department has been sent to Iloilo to assist in the work in that province.

In the regions where it first appeared—the city of Manila, Rizal, Bataan, Cavite, Bulucan, Pampanga, and Camarines provinces—the epidemic has practically passed, cases reported being sporadic cases, one to three or four a day from isolated towns.

But few of the provinces of Luzon have escaped the disease, and it is probable that all of them will be attacked before the epidemic disappears. All of the Visayan islands, with the exception of Romblon, Tablas, and Sibuyan, have been visited by the epidemic. Masbate has had but one sporadic case, which occurred on board a sailing vessel.

So far the island of Mindanao and the adjacent Moro islands, as well as Paragua, the Cuyos, and the Calamianes, have not been attacked, though it would not be surprising if the disease should make its way into Mindanao through the adjacent islands of Samar and Leyte, or possibly by communication from Bohol, Cebu, or Negros.

In the city of Manila there has been a gradual decline in the number of cases during the month. During the last week of July the policy of securing cooperation from the inhabitants of Manila, by means of auxiliary boards of health having at their head Filipino physicians, was put into effect. All of these boards have been under the control of the board of health and under the immediate supervision of the chief medical inspectors of the various districts of the city.

The Filipino wards at Santiago Cholera Hospital were placed in the immediate care of Filipino physicians, and the Tondo Cholera Hospital, which had been maintained by the inhabitants of Tondo, was taken over by the board of health, the Filipino physicians and attendants, however, remaining in charge.

No change has been made in the administration of the Chinese Cholera Hospital, which has, from the beginning, been excellently managed. We have never found it necessary to maintain more than one respresentative at this hospital, whose only duties were to see that proper sanitary measures were carried out and that all burials were made in accordance with the rules of this board.

The excellent work done by the Chinese Chamber of Commerce in handling the 60,000 Chinese residents of this city is best demonstrated by reference to the table of death rates per thousand for the months of July and August. In each of these months the Chinese death rate, including all deaths from cholera, was lower than for any other nationality represented here, not excepting Americans.

Considering cholera alone, the good work of the Chinese Chamber of Commerce becomes apparent from the figures of the month of August, when out of a population of 60,000 there were but 61 cases of cholera amoung the Chinese, while there were 51 among the Americans, with a population estimated at considerably less than 10,000.

It is believed that but few cases of concealment of cholera have occurred during the past month, certainly none of deaths, though it is possible that some of the mild cases resulting in recovery have never been brought to the attention of the health authorities. The distribution of a few simple medicines to the various auxiliary boards of health for the use of the poor has been beneficial in its effect. It is not probable that many cases of cholera have been cured by these medicines, but it is certain that many cases of diarrhea, always abundant during an epidemic, have been cured, thus removing a predisposing cause and gratifying the people, as the poorer classes firmly believe under these circumstances that they have been cured of true cholera.

The medical inspectors have kept their respective districts in as good sanitary condition as present facilities permit.

A change in the disposal of garbage and refuse has been made, which it is hoped will result in some benefit until the permanent system is established. Heretofore much of the garbage from Tondo, San Nicolas, Binondo, and Santa Cruz has been thrown on the Tondo beach.

Investigation showed that a little bay to the north of Manila, known as "Vitas," and which is accessible through the Tondo estero, offered excellent facilities for the disposal of refuse, because of a strong current flowing through the narrow channel connecting the bay with the sea, which at ebb tide flows at a rate of 4 to 6 miles an hour. Cascoes have been prepared for receiving refuse from the odorless excavators, which on being loaded can be quickly taken to Vitas, where the load will be disposed of by dumping into the swift current, which will carry it out into the bay.

The pail system is just being put into operation, and reports of the work for the month of August are inclosed herewith.

There has been but one case of smallpox during the month, and the work of vaccination continues without interruption. Some requests have come to the board to extend the time for revaccination to more than one year, but a careful consideration of the matter by the board has led it to decide that revaccination at the end of one year is not too frequent in view of present conditions.

One case of plague occurred during August, the measures which have proved so effective in dealing with this disease being immediately taken.

Every effort has been made by the board to respond to calls from the provinces for medicines and disinfectants. But few of the towns in the provinces were at all provided with even medicines or disinfectants at the outbreak of the epidemic. The board has therefore been called upon to supply these necessary articles without waiting to settle the question of accounts. In many cases the provinces and towns are fully able to pay all bills for such articles, and it is expected that after the epidemic is over the insular board will be reimbursed from the provincial or municipal treasury for articles sent, it being considered that the board has in these cases acted as purchasing agent to facilitate the quick delivery of necessary supplies. In other cases, however, the towns and provinces have been practically without available funds, and supplies have always been sent as requested to all such places. In one or two instances it has been necessary to send food, the scarcity of rice existing in some of the towns being so great as to become an important factor in the cholera situation.

The policy of burning houses throughout the provinces has been discouraged as much as possible from this office, although the authorities have been informed that they may burn houses when it is deemed necessary for the protection of the public health, upon assuming responsibility for all indemnity claims. In one case the board has authorized the destruction of infected rice, the claim for which will have to be adjusted later, and may perhaps have to be borne by the board. It was not deemed wise to allow the rice to remain undestroyed pending a settlement of the question of responsibility for payment.

It has not been deemed advisable to recommend cremation in the provinces, and in some cases orders have been issued to stop it, for the reason that none of the provinces possess proper facilities for carrying out this method of disposing of the dead. The result of attempting cremation has been to arouse the horror of the people, and their passive, and in some instances active, resistance to such measures and to all general sanitary measures.

The question of the removal of a cholera patient to the hospital, or of leaving such patients in the house, has been left, as a rule, to the judgment of the medical inspector in charge of the district, he basing his decision upon the character of the house, the facilities afforded for proper isolation, care of the patient, and the general intelligence of the family. Where the conditions were not found satisfactory the cases have been removed to the hospitals, where they have always received the best of care.

The mortality has been decreasing somewhat since the beginning of the epidemic, though in an examination of the mortality report it must be taken into consideration that in many cases, especially during the early months, reports of deaths were not made, the bodies being secretly buried by the family or friends; and it must also be remembered that very many more cases where recovery resulted were not reported, and therefore these figures must not be considered as absolutely correct. It is probable that at the present time the mortality rate is somewhere between 50 and 60 per cent; certainly not above 60.

A matter of the gravest importance which arises at this time is the reappearance of rinderpest among cattle. As is well known, many of the provinces have lost from 50 to 80 per cent of their cattle, and whenever new animals are imported from Borneo, Singapore, or China they seem to be attacked with the disease almost invariably within two or three months of the time of their arrival. Advantage was taken of the appearance of rinderpest in a newly arrived herd of carabao in this city to put into active operation the work of the Serum Institute, and at the present time prophylactic serum is on hand and ready for use for all who may apply for it up to the limit of the stock on hand. The board being perfectly in accord with your own desires and suggestions in regard to this work and its great importance, has decided to push this work as fast as it can be done, and hopes to have, within a few months, a herd of at least 100 immune animals from which serum can be obtained. For some time, until the people become convinced of the value of this serum, it will be distributed gratuitously to those who apply for it. As soon as it is made evident to the general public that the serum is effective, there will undoubtedly be large importations of animals from adjacent countries. The successful inoculation of these animals and the Filipino-bred animals throughout the provinces will give the greatest encouragement to agriculturists throughout the islands.

In conclusion, I wish to commend the energy, zeal, and ability of the regular medical inspectors of this board, of the assistant sanitary engineer, and of the medical officers of the Army on detail with this board, and others, amongst them a few emergency employees, to whose tireless work is due most of the credit for what has been accomplished during the present epidemic.

Very respectfully,

FRANK S. BOURNS,
Commissioner of Public Health.

EXHIBIT A.

CHOLERA STATISTICS.

Date of first appearance of cholera in the provinces from the beginning, according to the records in this office.

Place.	Province.	Date.
Malolos	Bulacan	March 23.
Cavite	Cavite	March 27.
Balanga	Bataan	March 28.
Nueva Caceres	Camarines	April 2.
Macabebe	Pampanga	April 13.
San Felipe	Rizal	April 2.
Calamba	Laguna	April 7.
Lingayen	Pangasinan	April 24.
Gerona	Tarlac	April 28.
San Isidro	Nueva Ecija	May 8.
Tacloban	Leyte	May 9.
Bauan	Batangas	May 24.
Basey	Samar	May 29.
Calapan	Mindoro	June 10.
Tiaon	Tayabas	June 13.
Iba	Zambales	July 1.
Twin Peaks	Benguet	July 4.
Boac	Marinduque	July 1.
Cebu	Cebu	July 14.
San Fernando	Union	July 15.
Bacolod	Negros West	August 26.
Iloilo	Iloilo	August 28.

Cases of cholera from the beginning to September 1.

Province.	Cases.	Deaths.	Mortality.
			Per cent.
Albay	----	----	----
Abra	----	----	----
Ambos Camarines	913	807	88
Antique	----	----	----
Bataan	2,596	1,691	66
Batangas	3,093	2,330	75
Benguet	101	101	100
Bohol	383	287	75
Bulacan	2,157	1,489	69
Cagayan	374	319	82
Capiz	----	----	----

Cases of cholera from the beginning to September 1—Continued.

Province.	Cases.	Deaths.	Mortality.
			Per cent.
Cavite	2,693	1,597	59
Cebu	1,363	810	60
Ilocos Norte	4,028	2,912	72
Ilocos Sur	9,223	5,711	62
Iloilo	67	46	69
La Laguna	2,458	1,831	75
La Union	2,722	2,271	84
Leyte	986	642	65
Marinduque	284	204	72
Masbate	1	1	100
Mindoro	285	235	82
Nueva Ecija	653	515	79
Occidental Negros	332	144	43
Oriental Negros	--------	--------	--------
Pampanga	813	614	74
Rizal	821	681	83
Pangasinan	9,494	6,502	70
Romblon	--------	--------	--------
Samar	81	69	85
Sorsogon	1	1	100
Surigao	--------	--------	--------
Tarlac	549	460	84
Tayabas	203	154	75
Zambales	2,050	1,198	58
Total	48,724	34,612	71
City of Manila	3,812	2,861	75
Provinces	48,724	34,612	71
Grand total	52,536	37,473	71

Report of cholera cases in Manila by weeks, from April 13, 1902; also from March 20 to April 12, inclusive.

From—	Cases.	Deaths.	From—	Cases.	Deaths.
March 20 to April 12	230	178	June 29 to July 5	284	214
April 13 to 19	131	94	July 6 to 12	332	224
April 20 to 26	171	149	July 13 to 19	270	208
April 27 to May 3	215	112	July 20 to 26	314	196
May 4 to 10	164	72	July 27 to August 2	306	212
May 11 to 17	168	94	August 3 to 9	186	141
May 18 to 24	87	72	August 10 to 16	151	125
May 25 to 31	64	54	August 17 to 23	142	103
June 1 to 7	69	63	August 24 to 31	189	120
June 8 to 14	74	57			
June 15 to 21	175	129	Total	3,917	2,768
June 22 to 28	195	51			

EXHIBIT B.

REPORT OF STATION A, BOARD OF HEALTH, FOR AUGUST, 1902.

San Nicolas District—Report for the month of August of sanitary notices served from this station.

Notices.	Total.	Completed.	Not completed.
Houses ordered whitewashed	31	26	5
Water-closets ordered cleaned	28	22	6
Ground floors ordered cemented	13	5	8
Chimneys ordered put on kitchens	3	--------	3
Roofs ordered repaired	1	1	--------
Roof drains ordered repaired	2	1	1
Houses ordered to make canals	5	5	--------
Total	83	60	23

LLIONEL A. STREET,
Chief Medical Inspector.

EXHIBIT C.

REPORT OF STATION C, BOARD OF HEALTH, FOR AUGUST, 1902.

STATION C, TONDO, MANILA, P. I., *September 5, 1902.*

The COMMISSIONER OF PUBLIC HEALTH.

SIR: I have the honor herewith to submit a report of the work performed in the district of Tondo for the period from August 1 to September 1, 1902.

Number of inspections made by assistant medical inspectors	450
Number of inspections made by sanitary inspectors	18,600
Number of reinspections made by sanitary inspectors	5,000
Number of orders issued to put premises in a sanitary condition	711
Number of orders complied with	641
Number of premises disinfected by disinfectors	300
Number of cholera cases—	
Reported	183
Found alive	110
Found dead	73
Removed to Tondo Hospital	75
Removed to Santiago Hospital	7
Left in houses	28
Left in houses, recovered	4
Left in houses, died	24
Removed to Tondo Hospital, recovered	17
Removed to Tondo Hospital, died	42
Remaining in hospital September 1	16

The population of Tondo is estimated at about 40,000; fully one-half live in small nipa shacks that afford but little protection from the inclemency of the weather. These people are of an ignorant class and very poor. The district is poorly drained; the street gutters are stopped up and choked with waste, in consequence of which the surface drainage soon becomes stagnant and foul. At high tide, and after heavy rains, a large portion of the district north of Calle Azcaraga is inundated.

The pail system carts all the excreta that it collects to Tondo beach. Its method of disposing of this collection is unsatisfactory, but another method has been devised and will soon be in operation.

Tondo market is in a very good condition. The slaughterhouse is in a very good condition, and the method of disposing of the offal is satisfactory. At present the Tondo Hospital is in very good condition. The comparatively high death rate is due to the fact that, as a rule, none but grave cases are reported at the station. The attending physicians at the hospital are faithful, and the nurses are devoted to their work. Of the cases left in their houses, 22 were left there for the reason that they were moribund when found.

During the month a circular of instructions was issued. A large number of the inhabitants are complying with at least some of them.

Eighty-five barrels of lime were distributed to the people, who used it in the disinfection of their premises. It seems to me that the instruction of the people in sanitary matters should be continued. A thorough cleaning and removal of waste from the streets and drains is urgently required.

The sale of cold, cooked food in the cheap restaurants and tiendas should be prohibited, for the reason that in these places such food is not protected from handling and decomposition, and in consequence is apt to become infected or cause ptomaine poisoning.

The prompt report of cholera cases should be enforced.

Very respectfully,

R. H. ZAUNER,
Major and Surgeon, U. S. Volunteers,
Chief Medical Inspector, Tondo.

EXHIBIT D.

REPORT OF STATION D, BOARD OF HEALTH, FOR AUGUST, 1902.

STATION D, BINONDO, *Manila, September 1, 1902.*

Cholera report.

Number of cases of cholera	60
Cholera cases transferred to hospital	30
Cholera cases sent to morgue	18
Cholera cases left in houses	12
Houses disinfected	56
Sick reported to municipal physician	114
Average daily number of houses inspected	887
Average daily number of houses reinspected	110
Total number ordered cleaned	2,868
Total number cleaned	1,610
Water-closets cleaned	186
Water-closets ordered cleaned	353
Houses ordered whitewashed	273
Houses whitewashed	59
Yards ordered cleaned	1,449
Yards cleaned	1,158
Sick reported by sanitary inspectors	83
Average number of inspectors doing outside work	10
Deaths from sickness other than cholera	79

ARLINGTON POND,
Major and Surgeon, U. S. Volunteers, Chief Medical Inspector.

EXHIBIT E.

REPORT OF STATION F, BOARD OF HEALTH, FOR AUGUST, 1902.

STATION F, QUIAPO, MANILA, P. I., *September 1, 1902.*

There were 38 cases of cholera reported at this station during the month. The cases, in respect to nationality, deaths, and mortality, were divided as follows:

	Cases.	Died in house.	Cured.	Died in hospital.	Cured.
Filipinos	31	20	2	4	5
Chinese	5		1		4
Americans	1				1
French	1	1			

Inspections by chief sanitary inspector	412
Inspections by sanitary inspectors	6,745

There were 42 orders issued from this office for August for repairing, cleaning, whitewashing, etc., and all of this work has been completed to date. One disinfecting outfit has been kept constantly on duty, and the inspectors have been instructed to report every foul odor or other unsanitary condition arising from filth and dirt. Upon the receipt of such reports the disinfecting wagon would be at once sent as a preliminary precaution and the cause removed later. Our low record throughout the epidemic is undoubtedly largely due to this disinfection. Lime and carbolic solution were used. The following is the report of the number of houses and persons disinfected:

Houses disinfected	422
Persons disinfected	111

EXHIBIT F.

REPORT OF STATION G, BOARD OF HEALTH, FOR AUGUST, 1902.

SANITARY STATION G, DISTRICT OF SANTA CRUZ,
Manila, P. I., August 26, 1902.

COMMISSIONER OF PUBLIC HEALTH.

SIR: I have the honor to submit the following report of sanitary operations in the district of Santa Cruz for the month of August, 1902, and, as in previous reports, I present a brief résumé of the previous months for comparative purposes:

Number of cases of cholera in district:	
April	43
May	58
June	75
July	165
August	119
Total since outbreak of epidemic	460

The above tables convey the gratifying information that for the first time since the outbreak of the epidemic has there been a decrease in the number of cases in this populous district.

Our records have been kept with exceptional care, and the generous aid given this station by the physicians and residents of the district insures the almost absolute accuracy of these figures.

The liberal policy adopted by the board of health is heartily appreciated by the residents of the district, and while very few cases are now sent to the cholera hospital we have failed to note in a single instance where the disease has spread by reason of patients being treated in their houses.

The complete renovation and reoccupation of the Arranque market is an incident of the month, and I regard it of importance in that it lessens the chance of food contamination and simplifies inspection. I recommend the immediate removal or destruction of the numerous shacks on the grounds temporarily used as a market.

The recurrence of cholera in Bilibid Prison and San Lazaro Hospital has ceased, no cases appearing in either institution for three weeks.

Calle Cervantes, over which nearly every funeral in Manila passes, is still in an unfinished condition and offers a serious hindrance to traffic. A previous communication on this subject secured immediate resumption of work, but it has again been abandoned and the public is greatly inconvenienced on account of a few hundred feet of unfinished road.

Very respectfully,

GEO. A. ZELLER,
Captain, Assistant Surgeon, U. S. Vols., Chief Medical Inspector.

EXHIBIT G.

REPORT OF STATION H, BOARD OF HEALTH, FOR AUGUST, 1902.

STATION H, BOARD OF HEALTH,
Manila, P. I., September 1, 1902.

Cholera report—General.

Americans	None.
Germans	2
Spaniards	1
Chinese	2
Filipinos	37
Total	42

Disposition.

Found after death	16
Treated in houses	12
Sent to Santiago cholera hospital	13
Sent to Chinese cholera hospital	1
Total	42

Burial report.

Bodies buried from houses	16
Bodies sent to morgue	12
Total	28
Cases sent to hospitals	14
Total	42

Home treatment report.

Number treated in houses	12
Deaths	12
Per cent of deaths to cases	100.00

Age report.

Cases under 15 years	11
Cases between 15 and 50 years	22
Cases over 50 years	9
Total	42

Sex report.

Males	27
Females	15
Total	42

Consolidated report of sanitary inspectors for the month of August, 1902.

Houses inspected by the chief sanitary inspector	440
Houses reinspected for verification of work ordered	370
Houses inspected by sanitary inspectors	9,886
Houses reinspected by sanitary inspectors	7,823
Houses ordered cleaned	1,004
Houses cleaned	831
Houses ordered whitewashed and painted	745
Houses whitewashed and painted	32
Houses disinfected	244
Houses where garbage has not been removed for two days	None.
Number of persons reported sick to municipal physican	36
Cesspools and vaults ordered cleaned	171
Cesspools cleaned	31
Yards ordered cleaned	935
Yards cleaned	790
Yards ordered repaired and repaved, etc	779
Yards repaired	92
Houses visited	1,240
Houses revisited	930
Total	2,170

EXHIBIT H.

REPORT OF STATION I, BOARD OF HEALTH, FOR AUGUST, 1902.

STATION I, BOARD OF HEALTH,
Manila, P. I., September 1, 1902.

Cases reported.

Male:	
Adult	26
Children	7
Female:	
Adult	19
Children	11
Total	63

Nationality.

Filipinos	53
Chinese	3
Japanese	2
Americans	2
Spaniards	1
Germans	1
English	1
Total	63

Cases found alive.

Treated in house	16
Sent to hospital	21
Total	37

Cases found dead.

Buried privately	10
Sent to morgue	16
Total	26

Cases treated in houses.

Died	15
Recovered	1
Total	16
Buried privately	1
Sent to morgue	14
Total	15
Houses disinfected	61
Contacts bathed	181

EXHIBIT I.

REPORT OF STATION J, BOARD OF HEALTH, FOR AUGUST, 1902.

Inspections made by chief sanitary inspector	1,254
Inspections for verification of work ordered	790
Inspections made by sanitary inspectors	8,787
Reinspections made by sanitary inspectors	6,649

Ordered cleaned.

Houses ordered cleaned	3,476
Houses cleaned	3,351
Cesspools and vaults ordered cleaned	58
Cesspools cleaned	47
Yards ordered cleaned	31
Yards cleaned	3,230
Houses disinfected	390

Ordered repaired.

Houses ordered whitewashed and painted	6
Houses whitewashed and painted	2,571
Houses ordered repaired	16
Houses repaired	9
Yards ordered repaired	13
Yards repaired	10

Notifications served.

Written notices served	121
Complied with	66
Number under way	26
Not complied with	29
Wells ordered closed	64
Wells closed	64

Sick and death reports.

Persons reported sick to municipal physician	167
Cases of cholera	50
Cases treated by physicians	11
Cases sent to Santiago Hospital	35
Cases dead from cholera	8
Cases sent to Morgue San Lazaro	3

Employees.

American sanitary inspectors	6
Filipino sanitary inspectors	7
Discharged	2
Special police	12
Discharged	4

Exhibit J.

REPORT OF STATION K, BOARD OF HEALTH, FOR AUGUST, 1902.

DISTRICTS OF PACO, PANDACAN, AND SANTA ANA, MANILA.

The following summary is submitted, showing the work performed, under the various captions, for the month of August:

Houses inspected by the chief sanitary officer	614
Houses reinspected for verification of work ordered	157
Houses inspected by sanitary inspectors	14,798
Houses reinspected by sanitary inspectors	2,801
Houses ordered cleaned (written)	1,245
Houses ordered cleaned (verbal)	9,209
Houses ordered whitewashed and painted	30
Houses whitewashed and painted	3
Houses disinfected	174
Houses recommended condemned and removed	59
Houses condemned and removed	None.
Localities where squatters are located	8

Wells from which samples of water have been taken and sent to the laboratory	48
Reports from the same	None.
Hydrants recommended reopened	11
Houses where garbage has not been removed for two days	326
Persons reported sick to municipal physician	70
Cesspools and vaults ordered cleaned	20
Cesspools cleaned	9
Yards ordered cleaned	1,481
Yards cleaned	6,099
Yards ordered repaired (repaved, etc.)	8
Yards repaired	5
Cholera cases reported by sanitary inspectors	21
Cholera cases reported by auxiliary advisory board	16
Cholera cases found "alive"	14
Cholera cases found "dead"	23
Orders issued during the month	83
Orders awaiting action	46
Orders pending in court	1
Food tiendas in district	222
Persons convicted for violation of food prohibition order	9
Average in visiting each street and barrio during the month	10
Regular inspectors on duty	5
Emergency inspectors on duty	5
Escaped lepers sent to San Lazaro Hospital	1
New leper cases sent to San Lazaro Hospital	2

THOMAS R. MARSHALL,
Captain and Assistant Surgeon, U. S. Volunteers,
Chief Medical Inspector.

EXHIBIT K.

REPORT OF STATION L, BOARD OF HEALTH, FOR AUGUST, 1902.

STATION L, BOARD OF HEALTH,
DISTRICTS OF ERMITA AND MALATE,
Manila.

Statistic report for the period August 1 to September 1, 1902.

Houses inspected by the chief sanitary inspector	721
Houses reinspected for verification of work ordered	72
Houses inspected by sanitary inspectors	12,896
Houses reinspected by sanitary inspectors	1,449
Houses ordered cleaned (written)	None.
Houses ordered cleaned (verbal)	1,672
Houses disinfected	33
Houses recommended condemned and removed	1
Houses condemned and removed	1
Wells from which samples of water have been taken and sent to laboratory	14
Houses where garbage had not been removed for two days	None.
Persons reported sick to municipal physician	24
Cesspools and vaults ordered cleaned	3
Cesspools cleaned	3
Yards ordered cleaned	1,872
Yards cleaned	1,872
Yards ordered repaired (repaved, etc.)	None.
Cholera cases reported by sanitary inspectors	8
Cholera cases reported by auxiliary advisory board	24
Cholera cases found "alive"	18
Cholera cases found "dead"	14
Orders issued during the month	6
Orders complied with during the month	5

Orders awaiting action	1
Orders pending in court	None.
Food tiendas in district	83
Persons convicted for violation of food-prohibition order	None.
Regular inspectors on duty	1
Emergency inspectors on duty	8

Respectfully submitted.

Thomas R. Marshall,
Captain and Assistant Surgeon, U. S. Vols., Chief Medical Inspector.

Exhibit L.

REPORT OF THE SANTIAGO CHOLERA HOSPITAL FOR AUGUST, 1902.

Santiago Cholera Hospital,
September 5, 1902.

Commissioner of Public Health.

Sir: I have the honor to submit to you the following report of this hospital for the month of August, 1902:

The following report of the cholera cases received at this hospital for the month of August covers the entire number of cases admitted to the institution, together with the number of deaths, patients discharged, and cases yet remaining in the hospital. Since the 1st of September a number of the patients noted as remaining in the hospital at the last of August have been discharged as convalescent, and it is reasonably safe to state that the greater number of the ones remaining will undoubtedly recover. The month of August shows a decided decrease in number of patients received when compared with July, during which month the patients admitted reached the number of 377, an excess of 215 cases above the month of August. The great difference in cases between the two months can probably be accounted for by two reasonable explanations: The unusually cool weather prevailing during the month, especially the latter half, has undoubtedly had no little influence in decreasing the spread of cholera and the mortality from it. The treatment of the disease in the homes of the patients has also affected the numbers received at this hospital, but to what extent it is impossible to say.

At the very first of the falling off of cases coming to this hospital the hospital force was decreased as rapidly as possible, yet sufficient American nurses to care for the white patients admitted were retained. At present there are two wards reserved for the accommodation of white patients, which are under the care of two American physicians, assisted by three American nurses. Each doctor is on duty for twelve hours at a watch, the night watch being aided by two American nurses. This is found advisable, an extra nurse being put on at night, owing to the extra work entailed by the patients.

Three native Filipino doctors are in charge of the wards reserved for the treatment of native patients, and are assisted by six native nurses, selected or recommended for their positions by the physicians under whom they work. In these wards all native patients coming to the hospital are treated, unless they should express a wish to be treated by American doctors and nurses. There have been but three cases of this kind up to the present.

In regard to the the American physicians on duty at this hospital, I would call your attention to the matter of long watches or periods of duty, which, owing to there being but two physicians on the staff, are necessary.

On the last day of August the staff and force of the hospital was as follows:

Physician in charge	1
American physicians	2
Filipino physicians	3
Clerk	1
Outside man in charge of buildings, grounds, etc	1
Dispensary clerk	1
American nurses	3
American cook	1
Men employed in laboratory	2
Native nurses	6
Chinese employed in laundry and yard	14
Native muchachos	15

Cases treated during August.

	Number.	Per cent.
Cases discharged	49	30.25
Deaths	77	47.53
Cases in hospital	36	22.22
Total	162	

Cases admitted in July	377
Cases admitted in August	162
Decrease in August	215

H. A. LINDLEY,
Physician in charge.

EXHIBIT M.

LIST OF DRUGS SENT TO THE PROVINCES IN AUGUST, 1902.

August 1, R. O. Wheeler, Malolos, P. I.:
- 50 pounds carbolic acid crystals.

August 3, Dr. Visintuan, Boac, Marinduque:
- 4 ounces one-thirtieth to 1 grain hypo. tab. strychnine sulph.
- 1 ounce one-eighth to 1 grain hypo. tab. morphine sulph.
- 1 liter tinct. opii camph.
- 10 dozen chlorodyne.
- 2 kilos bismuth subnit.
- 3 liters castor oil.
- 5 kilos magnesia sulph.
- 2 pounds quinine sulph.
- 1 liter ferri chlor. tinct.
- 2 ounces calomel.
- 3 ounces salol.
- 6 ounces guiacol carbonate.
- 24 jars beef extract.

August 3, Dr. Visintuan, Santa Cruz, Marinduque:
- 4 ounces one-thirtieth to 1 grain hypo. tab. strychnine sulph.
- 1 ounce one-eighth to 1 grain hypo. tab. morphine sulph.
- 1 liter tinct. opii camph.
- 10 dozen chlorodyne.
- 2 kilos bismuth subnit.
- 3 liters castor oil.
- 5 kilos magnesia sulph.
- 2 pounds quinine sulph.
- 1 liter ferri chlor. tinct.
- 2 ounces calomel.
- 3 ounces salol.
- 6 ounces guiacol carbonate.
- 24 jars beef extract.

August 3, Dr. Visintuan, Mogpog, Marinduque:
- 4 ounces one-thirtieth to 1 grain hypo. tab. strychnine sulph.
- 1 ounce one-eighth to 1 grain hypo. tab. morphine sulph.
- 1 liter tinct. opii camph.
- 10 dozen chlorodyne.
- 2 kilos bismuth subnit.
- 3 liters castor oil.
- 5 kilos magnesia sulph.
- 2 pounds quinine sulph.
- 1 liter ferri chlor. tinct.
- 2 ounces calomel.
- 3 ounces salol.
- 6 ounces guiacol carbonate.
- 24 jars beef extract.

August 3, Dr. Visintuan, Torrijos. Marinduque:
4 ounces one-thirtieth to 1 grain hypo. tab. strychnine sulph.
1 ounce one-eighth to 1 grain hypo. tab. morphine sulph.
1 liter tinct. opii camph.
10 dozen chlorodyne.
2 kilos bismuth subnit.
3 liters castor oil.
5 kilos magnesia sulph.
2 pounds quinine sulph.
1 liter ferri chlor. tinct.
2 ounces calomel.
6 ounces guiacol carbonate.
24 jars beef extract.
August 3, Dr. Visintuan, Gasan, Marinduque:
4 ounces one-thirtieth to 1 grain hypo. tab. strychnine sulph.
1 ounce one-eighth to 1 grain hypo. tab. morphine sulph.
1 liter tinct. opii camph.
10 dozen chlorodyne.
2 kilos bismuth subnit.
3 liters castor oil.
5 kilos magnesia sulph.
2 pounds quinine sulph.
1 liter ferri chlor. tinct.
2 ounces calomel.
3 ounces salol.
6 ounces guiacol carbonate.
24 jars beef extract.
August 4, Dr. de Jesús, Lucena, Tayabas:
50 pounds carbolic acid, crystals.
5 kilos bichloride of mercury.
August 4, Dr. Thomas, Baguio, Benguet:
100 pounds carbolic acid.
400 pounds chloride of lime.
20 pounds bichloride of mercury:
August 4, Dr. Dudley, Mariquina:
9 barrels of lime.
12 bottles brandy.
112 pounds carbolic acid.
8 pounds bichloride of mercury.
August 7, Governor of Abra, Bangued, Abra, P. I.:
9 ounces one-sixtieth to 1 grain strychnine sulph.
1 ounce one-eighth to 1 grain morphine sulph.
1,000 cubic centimeters tinct. opii camph.
24 ounces chlorodyne.
3,000 bismuth subnit.
6 liters castor oil.
5 kilos magnesia sulph.
3 pounds quinine sulph.
1,000 cubic centimeters tinct. ferri chlor.
6 ounces calomel.
3 ounces salol.
175 grams guiacol carbonate.
24 jars beef extract.
August 7, Governor Ney, Bombong, Nueva Viscaya:
4 ounces one-thirtieth to 1 grain strychnine sulph.
1 ounce one-eighth to 1 grain morphine sulph.
1 liter tinct. opii camph.
12 ounces chlorodyne.
2 kilos bismuth subnit.
3 liters castor oil.
5 kilos magnesia sulph.
2 pounds quinine sulph.
1 liter tinct. ferri chlor.
2 ounces calomel.
3 ounces salol.
6 ounces guiacol carbonate.
24 jars beef extract.

- August 8, president provincial board of health, San Isidro, Nueva Ecija:
  - 50 pounds carbolic acid.
  - 20 pounds bichloride of mercury.
- August 9, Lieut. B. Fiske, Twenty-eighth Infantry, Montalbon, Rizal:
  - 50 pounds carbolic acid.
  - 25 pounds bichloride of mercury.
- August 11, Mr. O'Donnell, school-teacher, Licab, Nueva Ecija:
  - 50 pounds carbolic acid.
  - 10 pounds bichloride of mercury.
- August 13, Dr. Mariano Felisardo, Iba, Zambales:
  - 100 pounds chloride of lime.
  - 25 pounds bichloride of lime.
  - 112 pounds carbolic acid, crystals.
  - 1 box medical supplies.
  - 1 disinfecting pump.
- August 14, Major Nichols, Tarlac, Tarlac Province:
  - 30 pounds carbolic acid, pure.
  - 25 pounds bichloride of mercury.
- August 16, Dr. Ricerra, president provincial board of health, Tuguegarao:
  - 75 pounds carbolic acid, pure.
  - 100 pounds corrosive sublimate.
  - 2 small disinfecting pumps.
- August 21, Makar Mindanao, sent by chief surgeon division of Philippines:
  - 1 kilo bismuth, subnit.
  - 500 grams bismuth, subgallate.
  - 90 grams hydrag. chlor. mite.
  - 500 grams quinine sulphate.
- August 23, Dr. Angeles, Mariquina, P. I.:
  - 200 grams ext. kola.
  - 200 grams tinct. canela.
  - 200 grams bismuth, salicilate.
  - 200 grams quinine sulph.
  - 100 grams fluid ext. ipecacuana.
  - 200 grams creta preparada.
  - 12 hypo. needles.
  - 6 fountain syringes.
  - 6 bottles chlorodyne.
  - 1 liter simple sirup.
  - 3 pounds carbolic acid.
  - 3 pounds bichloride of mercury.
- August 23, Dr. Thomas, Baguio, Benguet:
  - 5,000 camphor pills.
  - 1 kilo tinct. opium.
  - 2 quarts Squibbs' Mix.
  - 1,000 one-eighth grain morphine tablets.
- August 24, president board of health, Vigan, P. I.:
  - 5 ounces one-eighth grain morphine sulph. solution.
  - 10 one-thirtieth grain strychnine sulph. solution.
  - 3 kilos quinine sulph.
  - 24 jars beef extract.
  - 6 liters castor oil.
  - 6 dozen bottles chlorodyne.
  - 2 liters tinct. opii camph.
  - 5 kilos magnesia sulph.
  - 3 kilos tinct. chlor. iron.
  - 30 pounds bichloride mercury.
  - 300 pounds chloride of lime.
  - 112 pounds carbolic acid crystals.
- August 24, president board of health, Cuyó, P. I.:
  - 500 grams quinine sulph.
  - 90 grams iodoform.
  - 3 liters castor oil.
  - 500 cubic centimeters tinc. chlor. iron.
  - 1 kilo salicylic acid.
  - 200 pounds chloride of lime.
  - 55 pounds carb. acid, crystals.
  - 25 pounds bichloride of mercury.

- August 24, president board of health, Laoag, P. I.:
  - 6 dozen bottles chlorodyne.
  - 6 liters castor oil.
  - 10 ounces one-thirtieth to 1 drachm strychnine sulph.
  - 24 jars beef extract.
  - 5 ounces one-eighth to 1 drachm morphine sulph. solution.
  - 2 liters tinct. opii camph.
  - 5 kilos magnesia sulphate.
  - 3 liters tinc. chlor. iron.
  - 3 kilos quinine sulph.
  - 30 pounds bichloride mercury.
  - 300 pounds chlor. lime.
  - 112 pounds carb. acid, crystals.
- August 24, president board of health, Tagbilaran, Bohol, P. I.:
  - 2 pounds bismuth subnit.
  - 1 liter paregoric.
  - 2 dozen bottles chlorodyne.
  - 25 pounds bichlo. mercury.
- August 28, Dr. Dade, Aparri, P. I.:
  - 1,500 camph. and opii pills.
  - 250 grams salol.
  - 100 one-eighth grain morphine tablets.
  - 1 kilo sulph. acid.
  - 1 kilo chloroform.
  - 6 bottles bichloride mercury tabs. (600).
  - 1 kilo ether.
  - 50 grams salophen.
  - 600 pounds chlor. lime.
  - 30 pounds bichloride mercury.
  - 112 carb. acid, pure.
- August 28, Dr. E. T. Wilson, Puerto Princesa:
  - 1,000 grams boric acid.
  - 1,000 grams petrolatum speiss.
  - 2 kilos glycerine.
  - 20 pounds absorbent cotton.
  - 24 1-yard packages gauze.
  - 180 grams acetanilid.
  - 180 grams iodoform.
  - 500 grams salol, pulv.
  - 20 pounds bichloride of mercury.
  - 200 pounds chloride of lime.
  - 110 pounds carb. acid, crystals.
- August 29, Mr. F. Montavon, Sinaloan, Laguna, P. I.:
  - 6 ounces one-thirtieth to 1 drachm strychnine sulph.
  - 12 bottles chlorodyne.
  - 25 pounds bichloride of mercury.
  - 200 pounds chlor. lime.
  - 55 pounds carb. acid, crystals.
- August 28, Dr. James Mackey, San Fernando de Union:
  - 112 pounds carb. acid, pure.
  - 200 pounds chlor. lime.
  - 1 demijohn alcohol.
  - 25 pounds bichloride of mercury.
  - 8 ounces tinct. digitalis.
  - 1 ounce strychnine sulph., tablets.
- August 29, Dr. Whitemore, Mariquina, P. I.:
  - 300 pounds chlor. lime.
  - 25 pounds bichlor. mercury.
  - 112 pounds carb. acid, pure.
- August 29. Governor Flores, Rizal, P. I.:
  - 98 sacks rice, 13,750 pounds.
- August 30, Dr. Yulo, Negros, West, P. I.:
  - 30 bottles chlorodyne.
  - 1 kilo quinine sulph.
  - 100 tablets one-eighth gr. morphine sulph.
  - 1 liter tinct. iron.
  - 25 pounds bichloride mercury.
  - 400 pounds chlor. lime.
  - 112 pounds carb. acid, pure.

EXHIBIT N.

REPORT OF THE VETERINARIAN OF THE BOARD OF HEALTH FOR AUGUST, 1902.

MANILA, P. I., *September 3, 1902.*

The COMMISSIONER OF PUBLIC HEALTH.

SIR: I have the honor to submit the following report of the veterinary department, board of health, covering the period from August 1 to September 1, 1902.

There have been inspected the following animals arriving in Manila:

Cattle:		
Provincial	54	
China	1,074	
Singapore	520	
Australia	2	
		1,650
Carabaos:		
Provincial	15	
Borneo	10	
		164
Horses		280
Hogs		3,979
Sheep		6
Goats		48
Other animals		2
Animals slaughtered in the public matadero:		
Cattle		1,595
Hogs		5,177
Goats		1
Animals condemned and cremated in the public matadero:		
Cattle		2
Hogs		2
Cisticercus cellulosæ		6
Hog cholera		6
Heat exhaustion		4
Horses condemned and cremated in public crematory		5

During the first part of the month one herd of 33 carabao owned by Mr. Twombly, and shipped to the port of Manila from Borneo, were placed at pasture near the town of Santa Ana, where the herd developed rinderpest. They were immediately placed in quarantine, and, in order to produce serum for immunization, 21 of the animals were driven to the serum farm, San Lazaro, and used for experimentation, all dying with the exception of 2. Dr. Strong is carrying on the work of serum culture, with the assistance of the veterinary department of the board of health.

Respectfully,

W. W. RICHARDS,
Veterinarian Board of Health.

EXHIBIT O.

REPORT FROM THE BUREAU OF GOVERNMENT LABORATORIES OF WORK DONE FOR THE BOARD OF HEALTH IN AUGUST, 1902.

AUGUST, 1902.

Analyses.

Oils	1
Urines	43
Fibers	6
Medicines	5
Paints	2
Disinfectants	5
Sand	1
Total	63

Of the acetozone prepared, 800 capsules were issued for the treatment of cholera and dysentery, together with 666 liters of solution.

Diagnoses.

	Positive.	Negative.	Total.
Sputa, for tuberculosis	4	18	22
Blood, for Widal reaction	0	12	12
Smears, for gonococci	49	32	81
Feces			201
Ameba dysenteriæ	23		
Monads	8		
Ova trichocephalus dispar	1		
Ova uncinaria duodenale	1		
Tænia saginta	1		
Asiatic cholera	64		
Blood counts			29
Malarial parasites, tertian	2	26	28
Autopsies, bubonic plague			1
Water, food stuffs, etc.:			
Food stuffs, and other articles from houses in which cases of cholera have occurred, and from markets	3		1,134
Wells examined			95

Evidence of fecal pollution in six cases.

EXHIBIT P.

REPORT OF THE VACCINE INSTITUTE FOR AUGUST, 1902.

Persons vaccinated during the month of August, 1902, in Manila.

	Filipinos.	Chinese.	Americans.	Foreigners.	Total.
Intramuros:					
Children	341				825
Adults	472	9	2	1	
Binondo:					
Children	233				860
Adults	391	236			
San Nicolas:					
Children	237	3			788
Adults	401	147			
Tondo:					
Children	415				1,214
Adults	730	51	2	16	
Santa Cruz:					
Children	130				649
Adults	255	235		29	
Quiapo:					
Children	282				629
Adults	324	23			
San Miguel:					
Children	133				594
Adults	453	7	1		
Sampoloc:					
Children	234				681
Adults	432			15	
Paco:					
Children	473				801
Adults	287	37	2	2	
Ermita:					
Children	221				674
Adults	405	45	2	1	
Malate:					
Children	302				576
Adults	258	15	1		
Total	7,409	808	10	64	8,291

Number of units of vaccine furnished by the Vaccine Institute during the month of August, 1902.

Date.	To—	Number of units.
August 1	Board of Health	1,000
Do	do	175
August 4	do	2,500
Do	do	2,500
Do	do	2,500
August 10	do	175
August 11	do	2,500
August 12	do	2,500
Do	do	2,500
August 14	do	8,000
Do	do	1,000
Do	do	5,000
Do	do	2,000
August 17	do	175
August 24	do	175
August 25	do	2,500
Do	do	2,500
Do	do	2,000
Do	do	300
August 27	do	100
August 30	do	2,500
Do	do	2,000
Do	do	1,000
Do	do	1,000
Do	do	5,000
Total		51,600

Vaccine sent to the provinces during the month of August, 1902.

Date.	Where sent.	Number of units.
August 1	Dr. Thomas, Baguio, Benguet	1,000
August 5	President board of health, San José, province of Antique, Panay	2,500
Do	President board of health, Romblon	2,000
Do	Chief surgeon, Tacloban, province of Leyte	2,500
August 12	Province of Rizal	2,500
August 13	President board of health, Tacloban, province of Leyte	2,500
Do	Post surgeon, Tacloban, province of Leyte	2,500
August 14	President board of health, province of Camarines, N. Caceres	8,000
Do	Post surgeon, Calbayog, Samar	1,000
Do	President board of health, province of Capiz, Panay	5,000
Do	President board of health, Pangasinan, Lingayen	2,000
August 19	President board of health, province of Marinduque, Boac	2,000
August 25	President board of health, province of Romblon	2,500
Do	Post surgeon, Tacloban, Leyte	2,500
Do	President board of health, San Jose, province of Antique	2,000
Do	President board of health, province of Marinduque, Boac	200
August 27	Civil hospital	100
August 30	Post surgeon, Tacloban, Leyte	2,500
Do	President board of health, province of Leyte, Tacloban	2,000
Do	Dr. M. Yulo, Bacolod, W. Negros	1,000
Do	Dr. J. B. Thomas, Baguio, Benguet	1,000
Do	President board of health, province of Marinduque, Boac	5,000

EXHIBIT Q.

REPORT OF OPERATIONS OF THE PAIL SYSTEM FOR AUGUST, 1902.

MANILA, P. I., *September 1, 1902.*

The COMMISSIONER OF PUBLIC HEALTH,
Manila, P. I.

SIR: I have the honor to make the following report for the month of August, 1902:

Number of installations	405
Number of pails cleansed	12,565
Total cost, exclusive of office force, local currency	$1,446.50

Cost per installation per month, local currency	$3.58
Number of installations made in private houses since July 22	29
NOTE.—These installations were made temporarily with galvanized-iron pails and improvised commodes.	
Total number of public closets installed since July 1	4
Total capacity in pails	62
Number of excavator loads removed from public buildings	98
Total number of loads excavated for the month of August	106
Total number of excavator loads removed for private parties	8
Total number of closets ordered repaired in lieu of installing pail system since July 11	688
Number of orders complied with satisfactorily	343
Number of inspections made during progress of the work	1,135
Number of special letters sent to enforce proper compliance of orders	183
Number of complaints received	2
Number of complaints adjusted	2
Money collected for installation during the month of July (local currency)	$48.00
Cleaning charges for July (local currency)	$4.18
Money collected for installation during the month of August (local currency)	$312.00
(Cleaning charges not yet collected.)	
Amount collected on account of odorless excavators, month of July (local currency)	$130.00
Amount collected on account of odorless excavators, month of August (local currency)	$80.00
Total balance on hand (local currency)	$574.18

In regard to the disposal of excrement removed by the odorless excavators, would report that one of the casquitos belonging to the pail system is being equipped with a tank to have a capacity of 3,500 gallons, same to be used on the Estero de la Reina when permission shall have been obtained from the municipal board for the proper landing place. It is designed to use the same landing place as a central station for the collection and distribution of pails until such time as the contemplated steam barge is built. The casquitos when loaded will be poled to the "Bocana Vitas" and the contents of the tanks and pails will there be emptied into the current at the ebb tide. There is at this point a current two hours after ebb begins of at least 4 miles an hour, leading straight out into the bay. This method of the disposal of the night soil will remove all of the former objections to the system when dumping in front of Tondo beach.

Respectfully,

B. H. BURRELL,
Superintendent of Pail System.

APPENDIX C.

ABSTRACTS FROM THE CHOLERA REPORT OF CAPT. C. F. DE MEY.

Personal observations of Dr. C. F. De Mey, captain and assistant surgeon, U. S. Volunteers, with reference to the cholera epidemic of 1902, and deductions therefrom.

MANILA, P. I., *May 30, 1902.*

As soon as the bacteriologist at Manila reported the existence of Asiatic cholera there I offered my services to the insular board of health and was at once requested to enter upon my duties.

Prior to this epidemic I had seen many cases of cholera in the East Indies, and thus thought that my meager experience would be of some service to me, but it was of no avail. Some cases brought in died in ten minutes, some in two hours, some in two days, some in four days. They died just as they used to die years ago and will continue to die for years to come unless we change our tactics and fight the disease on different grounds. I do not pretend to form a plan of campaign against this obnoxious visitor, but some important discoveries were made which may be of assistance in dislodging this germ from its camping ground.

The following is a history of the checking of cholera when taken in time in six different towns:

Bulacan, province of Bulacan: I was sent here at a time when five cases of cholera had been reported, to see if the disease could be checked. The persons attacked were men who lived in a casco (lighter), and who had partaken of the same food and water. Upon their death they were buried in a plot of ground near the casco. The casco was dragged ashore and exposed to the sun's rays and all their goods were destroyed. There was not another case of cholera in Bulacan for more than a month, when it again appeared.

Malolos, province of Bulacan: One case developed suddenly, the person attacked being a man who had come from a town where cholera was bad. He was immediately quarantined in his own house and his family were quarantined elsewhere. He died a few hours later. The house was burned down and the ground for 5 yards around it was burned over. There was not another case of cholera for more than a month in this town, when it was again reported at the same time as in Bulacan, the two towns being about 7 miles apart.

Cavite, province of Cavite: I went next to Cavite, where cases had occurred in a populous market place. The market was burned down. Result, no more cholera for more than two months.

Hagonoy, province of Bulacan: Upon my arrival in this municipality the mortality had averaged 26 to 27 daily for more than two weeks, and had finally reached a maximum of 69 deaths in one day. I arrived there on the 6th of April and left on the 22d of April, no case of cholera having developed after the 19th of the month.

Macabebe, province of Pampanga: The reported mortality on the day I arrived at Macabebe was 74. I saw personally 14 bodies waiting transportation to the burial grounds. The others had been buried prior to my arrival, and I visited several secret cemeteries where the dead had been buried so that their families could escape the quarantine rules. Next day there were 60 deaths in the town and barrios. Fifty-six hours later the mortality dropped to 7, with 27 new cases. On the 25th there were 8 new cases and 6 deaths; on the 26th, 5 new cases and 7 deaths; on the 27th, still fewer; and from the 1st of May till the 21st there were only 9 deaths. For twelve consecutive days during this period there were no new cases and no deaths.

Bacolor, province of Pampanga: The mortality on my arrival in this town was running about 25 daily. I arrived there April 30. In the following twenty-one days the mortality was as follows: May 1, 10 deaths; May 2, 8 deaths; May 3, 2 deaths; May 4, 5 deaths; May 5, 5 deaths; May 6, 4 deaths; May 7, 3 deaths; May 8, 4 deaths; May 9, 1 death; May 10, 2 deaths; May 11, no deaths; May 12, 7 deaths; May 13, 2 deaths; May 14, no deaths; May 15, no deaths; May 16, 2 deaths; May 17, 1 death; May 18, 2 deaths; May 19, 1 death; May 20, 3 deaths; and May 21, 1 death. From these returns it will at once be observed how fickle the germ is. On May 11 there were no cases and no deaths, and the following day there were 7 deaths with 8 new cases. How did this occur? A heavy shower came down that afternoon and soon afterwards the cases were reported.

It is perfectly useless for any health officer to attempt to check an epidemic unless he can rule with a rod of steel. I speak of those who are in immediate charge in a stricken place. Orders ought not to emanate from a central bureau. The officer in immediate command must be able to control his own movements. A chief can not understand conditions in a town he has never visited. He may suggest, but he can not direct. A health officer should be the commanding officer of a city when that city is threatened with or has an epidemic, and must be left free to act according to his judgment. Firmness and discipline, whether among Caucasians or Asiatics, are essential. Without them, epidemics will continue to rage in spite of the familiarity of health officers with all sanitary laws and regulations.

His first duty should be to inquire where the disease started; second, where it is most virulent; and third, when and how it came there. He should at once throw a quarantine line around the infected area so as to protect adjacent areas, and should then proceed to disinfect thoroughly every infected house in the quarantined region. He should oblige every inmate of an infected house to wash his hands in some antiseptic solution, and all food in infected houses should be immediately thrown into the garbage basket. If this is not done new cases will invariably arise. This is positive. Patients should be sent to the hospital at once, or if this be impossible, should be put in rooms by themselves, with day and night nurses. Nurses should not be allowed to leave the houses, and before mingling with other inmates of the houses should thoroughly wash their hands. Inmates of a house in which a case of cholera has occurred should be at once removed to a detention camp, or if this is impracticable, should not be allowed to leave the house for five days. The floors should not be washed, but forks, spoons, and plates should be washed with boiling water. Should these orders not be obeyed, a severe fine should be imposed upon the whole family. Disinfection of the premises is useless unless every nook and corner is reached by the germicide.

As soon as an infected nipa house is vacated it should be burned, so as to destroy all infection and kill all insects in that particular house. Every family in a place should be ordered to keep smudge fires going under every house day and night to drive away insects which might carry infection, and to clean the ground under the house and for a distance of 4 meters in every direction about it, not leaving a single tuft of grass standing. In the absence of better means of disposing of excrement it should be covered with ashes from the smudge fires. All clothes and bedding should be daily hung in the sun. The streets should not be sprinkled. All food and drink should be boiled. Every hole containing stagnant water should be filled. The hands should be carefully washed before eating.

The cleaning of the ground under and about the house and the boiling of food and drinking water are most important. The natives here have a peculiar habit of defacating and urinating within a few feet of their houses. The feces are usually left in the grass where they can not be seen, but are readily discovered by poultry. The native chicken is somewhat partial to this kind of food and to the insects and to the larvæ about it, and thus becomes directly or indirectly a bearer of disease to human beings. Have the natives no water-closets? They have, or at least pretend to have, but the fact is that when a native, whether man, woman, or child, is traveling from one place to another and is by chance taken short he thinks nothing of stepping inside and depositing his card in your yard. This has been done for centuries. I stopped it entirely at Hagonoy, Macabebe, Bacolor, and other towns which I visited.

Why should the cleaning of the ground for 4 meters about a house be one of the principal factors in preventing cholera from entering or spreading in a community? We know positively that the cholera germ can not live long in dry ground, and that the slightest rain or humidity favors its continued existence. Houses under my immediate observation where cholera cases had developed were as a rule surrounded by a thick growth of grass. Few cases were reported from houses built of stone which had not grass surrounding them. The natives get much of their food from stores and markets where food is handled by hundreds of persons before it is at last purchased. What is the use of having the ground about a house cleared if the disease is only communicated from food? The natives have a way of throwing through the floor bits of food which, if not isolated from positive sources of contamination, will soon become infected and afford a breeding ground for the germs, which may then find their way into food or water kept close at hand. Children play under the houses, picking up pet roosters or dogs, from contact with which their hands may become infected. If there is a dry, clean zone about the house cleanliness can be enforced upon the occupants, and danger is reduced to a minimum.

I am more afraid of a fly in a cholera hospital than of a hundred patients having the disease. I was laughed at by many doctors and by persons not of the medical profession on account of my system of kindling smudge fires. I believe that these smudge fires were prime factors in my success. Why do they so greatly aid in arresting an epidemic of cholera? Because they drive away all flies and kindred insects, and I can vouch, as can my American inspectors, for the fact that as soon as we had a town thoroughly smoked we were able to sleep without mosquito bars. Flies, mosquitoes, and eventually cholera, disappeared. Much continuous smoke is required for forty-eight hours. Then the kindling of about three good smudge fires daily until the cholera, or the prime factor in its spread, the flies, have disappeared. Smudge fires should be kept up from time to time until there is no trace of cholera in the surrounding country.

Poultry are a more fruitful source of infection than many other articles of food or animals. They are scavengers, and are often to be seen in water-closets fighting over excrement. Here is a typical case which I can vouch for. In front of the prison at Bacolor in which I had my quarters there was a small house in which lived a man, a woman, and their little son. One day I noticed the little one picking a chicken, and was interested in the deftness with which he picked it. The next morning the child was dead. I went immediately into the house and told the father and mother to throw all food away. The mother told me that she had nothing left but a piece of the chicken which the little one had been eating, and as it was the only thing in the house she thought she might keep it. I made the serious mistake of not throwing it away myself, and the next day the mother died of cholera. I went immediately to the water-closet, and sure enough, there were the chickens feasting. Some natives like their poultry well done; others like it rare. The cooking of the chicken in this case had not killed the germs.

Let us keep our hands clean; let us keep our mouths clean; let us keep the flies and other insects out of the house, and boil all of our food and water. I did it and have been free from cholera, although I handled more than five hundred cases.

APPENDIX D.

REPORT OF THE CHIEF QUARANTINE OFFICER FOR THE FISCAL YEAR ENDING JUNE 30, 1902.

OFFICE OF THE CHIEF QUARANTINE OFFICER FOR THE
PHILIPPINE ISLANDS, MARINE-HOSPITAL SERVICE,
Manila, P. I., July 24, 1902.

The SECRETARY OF THE INTERIOR FOR THE PHILIPPINE ISLANDS,
Manila, P. I.

SIR: I have the honor to hereby submit report of the quarantine service in the Philippine Islands for the fiscal year ending June 30, 1902, and in doing so I have deemed it advisable to submit in tables the work performed during the year.

The Mariveles quarantine station was opened on September 26, 1901, with Asst. Surg. J. W. Amesse in temporary charge, since he was the only officer available for this post at that time, as the officer detailed for this duty had not arrived. The boarding duty, in addition to an excessive amount of executive work, devolved upon the chief quarantine officer for the succeeding two months, until Asst. Surg. J. D. Long arrived and was available to assume command of the Mariveles station on December 1, 1901.

In this connection it may be advisable to invite attention to the small number of officers on duty at the Manila station, since it necessitates continuous work of the most trying character in a tropical climate, at the risk of sickness and physical disability of the officers on account of overwork, with no opportunity for relaxation. Two officers at Manila and one at Mariveles is not a sufficient number to perform the great amount of work at these stations. It is true the work has been done and thoroughly, but it has been accomplished by impairing the health of the officers. Add to this the great increase of work incident to a severe cholera epidemic and that produced by the institution of an outgoing quarantine service, consider the great number of vessels disinfected, the large number of troops returning to the United States, the immense quantity of baggage disinfected, and it will be apparent to any one who gives the subject careful thought that the personnel of this station has been taxed to its utmost physical ability.

The boarding officer is on duty continuously every day from 6 a. m. to 6 p. m., and the officer at Mariveles has had extremely hard work, often on duty from 5 a. m. to 11 p. m. disinfecting ships, personnel, and baggage. He has only been able to leave the station, even to the adjacent village, two days during the past four months.

What has been said relative to the officers applies to the chief clerk at Manila. He has been obliged to work day and night in order to keep the clerical work even approximately up to date.

When the acting assistant surgeon resigned in January, 1902, the Marine-Hospital Bureau was requested to detail an additional officer for duty here to fill this vacancy, since it would lighten the labors of the assistants at Manila and Mariveles, and besides one officer would be available for temporary duty in the event of illness of some of the other officers, but as yet this detail has not been made.

The boarding of vessels is done at Manila from 6 a. m. to 6 p. m., except those vessels that arrive from infected ports. The latter are required to call at Mariveles for examination, disinfection, and detention if necessary, before coming to Manila, and are again boarded at Manila to see if they have complied with the above requirements. If a vessel arrives with a quarantinable disease on board, the boat is immediately remanded to Mariveles for disinfection and detention. The launch *Zapote*, owned and operated by the quarantine service, is used for boarding duty at Manila. This launch has already been described in previous reports.

The boarding of vessels at Mariveles is done by means of a rowboat, as the small launch intended for use at this station was lost in being brought over from Hongkong. The means available are not satisfactory, since not having a small launch has proved a hardship to the officer in command on account of the great amount of inspection work necessary during the cholera epidemic.

The inspection of vessels and their personnel is rigid at both Manila and Mariveles. The ships are critically examined, inquiry made concerning the food and water supply, the manifests examined for food products and other articles that may have been shipped from infected ports and that have not been certified to by officers of the service on duty in connection with the United States consulates in foreign countries; and the glandular regions of Asiatics, arriving from ports suspected of being infected with plague, are examined in order to detect mild and ambulant types of the disease. If any of the passengers or crew are ill in such a way as to be suspicious, the vessel is either held or remanded to Mariveles for quarantine detention, for observation, or for disinfection if necessary.

The inspection work at Cebu and Iloilo has been conducted in the same manner as at Manila, and special attention has been paid to the examination of vessels arriving from Hongkong and Singapore. Food products on these boats that have not been certified are invariably rejected and not allowed to be landed at these ports. The launch *Sanidad* is available for boarding work at Cebu, and the launch *Mariveles* is used for a similar purpose at Ilolio. These boats have been described in previous reports. There is one officer at Cebu and one at Iloilo.

The quarantine work at Zamboanga and Jolo, other ports of entry, has been performed by the surgeons of the United States Army stationed there. Only a few vessels enter these places from foreign ports, and it has not been deemed necessary to request detail of regular quarantine officers for duty at these ports.

While the officers mentioned are not under the jurisdiction of this office, still I have sent them letters embodying the regulations enforced at this and other ports, and they have conducted the quarantine in accordance with the suggestions given. I have supplied wood alcohol for formaldehyde disinfection to the officer at Jolo, and these officers have advised me of anything of importance. Upon my request they have rigidly enforced the regulations relative to food products and other prohibited articles coming from infected ports, and no infected vessels have arrived there during the past year.

During the year Aparri has been made a port of entry, and although as yet few vessels from foreign ports have called there, still I think some of the boats from Hongkong and Amoy will in all probability do so in the near future. I believe that this will be a port of secondary importance for the next year, but since it is the outlet for a large and populous section of northern Luzon some vessels from foreign ports will probably call there before coming to Manila, and for this reason a quarantine officer should be detailed for duty at that port. At present the army surgeon stationed there is performing the quarantine work.

The disinfection of baggage has been extremely heavy during the year, since, in addition to that on island boats, rendered necessary on account of the plague and cholera epidemics, the effects of 33,837 passengers returning to the States have been disinfected.

The baggage on outgoing boats is disinfected at Manila by the formaldehyde process, and although the means at hand are not as satisfactory as they might be, still the work has been accomplished, and the best proof that the disinfection is effective is evidenced by the fact that notwithstanding the great number of troops returned to the States, no infectious or contagious disease can be traced to this source. When it is taken into consideration that 110,713 pieces of large baggage have been disinfected at the Manila and Mariveles stations, it will be seen that this station has risen to one of the first importance conducted by the Marine-Hospital Service; in fact, the work performed here represents an equal amount of the sum total of several of the larger quarantine stations in the United States. This has been accomplished with a very small personnel, and I believe that I am correct in saying that no greater amount of important work has been accomplished by a personnel of three officers during a corresponding period of time.

The disinfection of vessels, except in the case of very small boats, is not attempted at Manila, but is performed at Mariveles. In fact, all infected vessels are remanded to the latter place for thorough disinfection and quarantine detention. This work has also been heavy, since 382 vessels have been disinfected during the year. Many of them had cases of cholera occur on board while in quarantine prior to sailing, others were ships from Hongkong and Amoy with cases of plague on board, and the balance were either disinfected on account of coming from near-by ports infected with cholera and plague, or for the purpose of killing rats on board as a precautionary measure to prevent the introduction of plague into Manila or island ports through their agency.

The Mariveles station, which has been designed, constructed, and equipped since the Marine-Hospital Service assumed charge of the maritime-quarantine work in the Philippines, is the most modern and best equipped in the Orient, and one that will stand the test of intelligent criticism, the equipment and management of which will bear favorable comparison with most in the world.

Ships of the largest size can come directly alongside the wharf, which is 400 feet long and 45 feet wide, so as to insure quick disinfection of both ship and personnel. The disinfection shed, 150 feet long, is equipped with two 16-foot Kinyoun-Francis steam disinfecting chambers, with all latest improvements, which, with transfer tables and ample steam from a 70-horsepower boiler for operation, insures rapid disinfection of baggage. The chambers are equipped with formaldehyde apparatus for disinfection of fine fabrics and articles that are injured by steam. Two sulphur furnaces are installed, with sufficient pipe to extend the entire length of the wharf, so that in using sulphur the necessary quantity of fumes can be rapidly introduced and any compartment of the largest ship can be reached with facility. The bath houses are also located on the wharves, as well as the detention room for the passengers after the bath. The working capacity of the plant is the bathing and disinfection of the clothing and baggage of 150 passengers an hour, the time necessary for one of the Hongkong boats with an ordinary complement of passengers being about three hours.

The station is provided with ample means for the detention of suspects, three barrack buildings so arranged as to provide for six segregation groups being available for this purpose. One thousand steerage and 80 cabin passengers can be placed in barracks at one time and properly cared for, and during the year 12,158 persons were detained in the buildings at the station for a period of five days or longer. These buildings were built during the preceding year, and have already been fully described in my annual report for 1901.

The hospital is ample and consists of two wards, one of which is used for those sick with contagious diseases and the other for patients suffering from other diseases. Proper isolation can be effected, and this fact was borne in mind in designing the building. During the year the following cases have been treated at the Mariveles station:

Report of patients treated in hospital at the Mariveles quarantine station during the fiscal year 1902.

Disease.	Number of cases.	Nationality.				Result.	
		Americans.	Europeans.	Filipinos.	Chinese.	Recovery.	Death.
Smallpox	2	1		1		2	
Measles	1				1	1	
Plague	2				2		2
Cholera	21	7	2	12		[a]5	16
Dysentery	1			1			1
Beriberi	9			3	6	5	4
Valv. disease heart	3			2	1		3
Totals	39	8	2	19	10	13	26

[a] 3 Americans, 2 Filipinos.

The small number of cases of cholera treated in hospital is accounted for by the fact that most of the cases were removed at Manila before the vessels were remanded to Mariveles.

During the year a cabin-passenger barracks has been constructed at a cost of $29,097.87. This building is two stories with a porch on the front and ends and is well suited for the purpose it is intended to serve. It is 141 feet 6 inches long and 45 feet wide, having a total of 34 rooms divided into 8 suites by central and lateral halls. The dining room is situated on the back of the central portion, and is 25 feet by 22½ feet. This is also two stories in height, the lower floor being the dining room, and the upper divided into 6 rooms, which are intended for the accommodation of the servants of the cabin passengers.

The kitchen is located back of the dining room, the two being connected by a covered passage, is 25 by 15 feet, has tiled floors, and is equipped with range and two sinks, with hot and cold water connections. The toilet room is situated in the rear of one wing, is of two stories, and is equipped with water-closets, stationary washstands, bath tubs, and shower baths, with hot and cold water connections.

The Mariveles station has also been equipped during the year with an electric lighting plant at a cost of $6,000, although the final payment of $2,000 has not yet been made on account of alterations necessary to make the installation conform with the specifications. The plant is a 30-kilowatt dynamo, with direct connected engine, and is large enough to provide lights for any increase in the number of buildings that the future importance of the station may render necessary. Three arc lights are placed on the wharf and three in the grounds, which sufficiently light the reservation. The plant has been in operation for the past four months and has proved of incalculable value, since vessels are now disinfected at night as well as during the day.

Since the operation of the large electric lighting plant is expensive, on account of the amount of coal used, it is only run during the time that persons are detained in quarantine, or in order to perform disinfection work at night. However, for economy and to avoid the risk of using coal oil for lighting purposes, it is proposed to install a 40-light dynamo, to be operated by a water wheel, for the purpose of furnishing lights to the officers' and attendants' quarters and other buildings that are in continuous use, since there is sufficient pressure on the water main to operate the same without cost except for the installation. A contract has already been awarded for this work, as well as for the installation of a watchman's clock with six stations, the total cost to be $1,100.

A water-pressure regulator with extra valves to the water system has been installed during the year at a cost of $480. This was found necessary to protect the plumbing, as the pressure on the pipes was so great as to cause the water-closets to be constantly out of order.

The barge *Proteccion* has been equipped as a floating disinfecting plant for Cebu during the year. The boat is 118 feet long, 25 feet wide, and 9½ feet deep. It is equipped with two 9½-feet Kinyoun-Francis steam disinfecting chambers with formaldehyde apparatus, one 40-horsepower vertical boiler, one sulphur furnace, fan, engine, one portable formaldehyde autoclave, and one bichloride pump.

A floating plant has also been equipped for Iloilo, the *Esmeralda*, a dismantled schooner, having been bought for the purpose. The boat is 96 feet long, 20 feet wide, and 9 feet deep. The equipment is the same as that of the *Proteccion*. The cost of the two barges has been $40,000.

These plants will furnish ample means for disinfection work at Cebu and Iloilo, and these stations will not need further equipment at present. At the same time these stations will serve for disinfection and treatment of infected vessels arriving at smaller ports, since those arriving at Jolo and Zamboanga and to the south can be remanded to Iloilo, and those to the south and east can be easily sent to Cebu without much loss of time.

It has been necessary during the year to issue several circular letters relative to quarantine and to institute various protective measures to prevent, if possible, the introduction of contagious or infectious diseases into the Philippine Islands.

On account of the severe epidemic of plague that prevailed in Hongkong and Amoy during the spring and summer of 1901, the native and Asiatic steerage passengers were not brought from May 1 to September 30, 1901. This afforded the best protection to the Philippine ports, and was the same procedure as that followed in the preceding year. It was pointed out to the steamship agents that if this class of passengers were brought, it would render their vessels suspicious and liable to infection, and that it would be necessary to impose quarantine in order to protect the Philippine ports. This restriction was removed on September 30, 1901, after the subsidence of the plague epidemics.

The outgoing quarantine imposed on vessels sailing from Manila to island ports, on account of the prevalence of plague in Manila, was discontinued on September 30, 1901, owing to the improved conditions in the city. The following circular etter was sent to the local agents of vessels:

[Circular letter.]

OFFICE OF THE CHIEF QUARANTINE OFFICER
FOR THE PHILIPPINE ISLANDS,
MARINE-HOSPITAL SERVICE,
Manila, P. I., September 25, 1901.

To ship owners and agents, Manila, P. I.

SIRS: You are hereby informed that in view of the fact that the plague epidemic has about subsided, the inspection of outgoing vessels and the disinfection of baggage of the native and Chinese passengers will be discontinued on the 30th of September.

Ships must secure bills of health as at present.

Respectfully,
J. C. PERRY,
Passed Assistant Surgeon, U. S. M. H. S.,
Chief Quarantine Officer for the Philippine Islands.

On December 17, it having previously been demonstrated that the rats in Manila were infected with plague to the extent of 1½ to 2 per cent, and in order to eliminate this factor in spreading the disease to island ports and to assist the board of health in the crusade for the extermination of these animals, I ordered that all vessels sailing from Manila to the United States or island ports should be disinfected with sulphur in order to destroy the rats on board. This disinfection was also practiced on the Hongkong boats for the purpose of adding further protection to Manila.

Circular letter to agents is embodied herein:

[Circular letter.]

Office of Chief Quarantine Officer
for the Philippine Islands.
Marine-Hospital Service,
Manila, P. I., December 17, 1901.

To ship owners and agents, Manila, P. I.

Sirs: In view of the fact that plague still exists in the city of Manila and that 2 per cent of all rats, as demonstrated by the board of health's examinations, are afflicted with this disease, it becomes necessary to take active measures to prevent its spread to other ports of the islands by importation of infected rats.

It has been demonstrated that rats are the principal, if not the only, factor in the spread of plague, and ships almost invariably become infected from this source; therefore I deem it necessary to disinfect all vessels, of whatever size or nature, sailing from Manila to other Philippine ports, in order to destroy the rats on board and thereby prevent the ship from becoming infected and carrying plague to other places.

You are hereby notified that this disinfection will commence on Monday, December 30, 1901, and will continue until all vessels have been disinfected for killing rats. This work will be done in Manila when the ship is unloaded and before new cargo is taken on board. It will only be necessary to delay the vessel about twelve hours, or not at all if the ship is unloaded during the afternoon so that sulphur can be placed in the ship and the hatches of the vessel kept closed during the night (about twelve hours), as on the following morning the loading can be commenced.

No vessel leaving Manila after the date specified will be granted a bill of health until this disinfection has been done.

You are requested to notify this office promptly at what hour and date the vessel will be unloaded and ready for disinfection and the place in the river at which the boat is anchored. This is essential to facilitate the work and cause as little delay to the vessel as possible.

Trusting I will have your hearty cooperation in this matter,

Respectfully,

J. C. Perry,
Passed Assistant Surgeon, U. S. M. H. S.,
Chief Quarantine Officer for the Philippine Islands.

On March 3, 1902, Assistant Surgeon J. W. Kerr, United States Marine-Hospital Service, cabled that cholera was present in Canton, and that he had notified the steamship companies that the regulations would be enforced from that date relative to food products and other articles that were prohibited shipment from cholera-infected ports. Rumors of the presence of cholera in Canton had been heard, but it was impossible to verify the truthfulness of them. I immediately notified Assistant Surgeon Kerr that I would require the most rigid inspection and disinfection of Asiatic passengers; that food products and other articles prohibited by regulations would not be allowed to land, unless certified by him as coming from noninfected ports, and that quarantine would be imposed on vessels arriving from Hongkong in the event of the cholera becoming epidemic in Canton or appearing in Hongkong.

In this connection I wish to state, as pertinent to the manner in which cholera was introduced into Manila, that this city is the greatest vegetable market in the Orient, since nothing of this nature is produced in the Philippines and everything is imported. Nearly all these vegetables, potatoes, cabbage, celery, and lettuce, come from Canton and the West River country adjacent. The Chinese method of fertilizing plants is too well known to mention, and the danger from such articles as cabbage, lettuce, and celery, which are often eaten in the uncooked state, is apparent when there is possibility that a disease like cholera has prevailed in the territory in which they have been grown.

On the 8th of March one or two cases of cholera were reported in Hongkong, but the disease was probably there before, as we now know that cholera had existed in epidemic form in Canton for some time before its presence was detected, and it is difficult to see how Hongkong could have escaped with the free and unobstructed intercourse between the two cities. On the 14th of March a vessel arrived from Hongkong with cholera noted on the bill of health, and in response to a telegram sent on the day following Assistant Surgeon Kerr stated that 12 cases had occurred up to the 16th of the month.

On the 17th of March a five days' quarantine was declared against vessels arriving from Hongkong, and the following circular letters were sent to the steamship agents here, at the same time telegraphing Assistant Surgeon Kerr to that effect, and requesting him to notify the Hongkong agents.

[Circular letter.]

OFFICE OF THE CHIEF QUARANTINE OFFICER
FOR THE PHILIPPINE ISLANDS,
MARINE-HOSPITAL SERVICE,
Manila, P. I., March 17, 1902.

To the Steamship Agents, Manila, P. I.

SIRS: In view of the fact that 12 cases of cholera have occurred in Hongkong since the 12th instant, and a further spread of the disease is expected, I have the honor to inform you that all vessels arriving from Hongkong will be quarantined upon arrival at ports in the Philippine Islands for a sufficient period of time to complete five days from date of sailing. You will please notify your agents in Hongkong that all vessels for Manila must call at Mariveles for this detention.

Vessels for Australian ports, taking passengers in Hongkong, making Manila a port of call, are subject to the same regulations.

You are also notified that articles of merchandise that can not be certified to by Dr. Kerr in Hongkong, if brought, can not be landed and must be returned to Hongkong.

Respectfully,

J. C. PERRY,
Passed Assistant Surgeon, U. S. M. H. S.,
Chief Quarantine Officer for the Philippine Islands.

[Circular letter.]

OFFICE OF THE CHIEF QUARANTINE OFFICER
FOR THE PHILIPPINE ISLANDS,
MARINE-HOSPITAL SERVICE,
Manila, P. I., March 19, 1902.

To the Steamship Agents, Manila, P. I.

SIRS: I have the honor to inform you that the shipment of the following articles from places infected with cholera is prohibited by the United States quarantine regulations, and they must not be brought to Philippine ports:

As ballast: Earth, loam, soft or porous rock.

Food products: Unsalted meats, sausages, dried and smoked meats, rennets, fresh butter, fresh milk (unsterilized), fresh vegetables.

Merchandise, etc.: Bedding, personal effects (unless disinfected), rags, old jute, old gunny, old rope, human or other hair (unmanufactured), bristles, wool, hides, and feathers.

Miscellaneous: Gelatine, glue, glue stock, fish glue, fish bladders, sausage casings, bladders, and dried blood should not be shipped if there has been any possibility of their infection in the process of preparation.

This regulation will apply to Canton, West River country, Hongkong and surrounding districts, Macao, Amoy, Singapore, Batavia, and probably Swatow and Foochow at an early date.

I strongly advise all agents to refuse to take Asiatic and native steerage passengers from Hongkong and Amoy, as the danger of sickness actually occurring on board would be much increased and subject the ship to a much longer period of quarantine.

You are hereby notified that vessels bringing steerage passengers from Amoy will be detained five full days in quarantine at Mariveles after the completion of disinfection at that station, and upon the appearance of plague in Amoy the period of quarantine will be made longer if this class of passengers is brought.

Respectfully,

J. C. PERRY,
Passed Assistant Surgeon, U. S. M. H. S.,
Chief Quarantine Officer for the Philippine Islands.

The authorities here were notified of the conditions, and were informed that in my opinion the situation was grave and that Manila was in serious danger from invasion of cholera, although every precaution was being taken to prevent the disease gaining entrance.

On March 20 cholera was detected in Manila. The first case was that of a Filipino, who lived in the Farola district near the mouth of the Pasig River, and was taken to the San Juan de Dios Hospital for treatment. He rapidly grew worse, and since the board of health, acting on the information I had given, had requested the physicians of the city to report any case presenting the symptoms of cholera, it was reported and was seen by members of the board of health and myself a few hours later. During the night of the same day a second case suffering from the same disease was admitted and died before morning, the second case dying on the second day of the disease. These cases had been isolated by the hospital authorities and were considered suspicious of cholera, if not the disease itself, but as it was a matter of such extreme importance, a positive diagnosis was reserved until bacteriological examinations had been completed. This examination confirmed the diagnosis of cholera, and energetic measures were at once instituted to detect other cases as early as possible and to destroy the centers of infection in an attempt to "stamp out" the disease. Cases continued to occur in the Farola and the adjacent districts of San Nicolas and Tondo.

The question of extreme importance to both the board of health and especially to this office was: How did the infection enter; through what means or agents? I know positively that no vessel arrived prior to that time with sickness of even a suspicious nature on board, and consequently it could not have been introduced through passengers or baggage. This statement is further borne out by the fact that all the first cases were among the Filipinos that had not been out of Manila for months, and not among the Chinese—the class of passengers that had landed. I think that cholera was unquestionably introduced into Manila by infected vegetables from Canton, and in this the board of health concurs; but it has been impossible to trace it to any particular cargo of such products. There is no question but that the cholera bacillus will retain its vitality for a considerable length of time on vegetables, and these articles were brought to Manila in large quantities while cholera was more or less epidemic in Canton, prior to the time its presence became authentically known and the shipment of vegetables stopped. Another possible manner was the smuggling on shore at night of vegetables that had been concealed on board vessels sailing after these articles had been prohibited. That vegetables were concealed on board is evidenced by the fact that some were found hidden in lockers, coal bunkers, and other portions of the ship on several of the vessels when searched relative to this particular matter by the quarantine officers. It is possible that all were not found, and that those not detected were smuggled on shore at night. The incentive was present, as the price of vegetables had materially advanced since their shipment from Hongkong had been prohibited.

A third possible source, through the same agents, was the arrival of the steamship *Rubi* on the night of the 16th of March with a large cargo of cabbages and potatoes which Assistant Surgeon Kerr had refused to certify. Permission to land any of these articles was refused, and the captain was ordered to return them to Hongkong, or if the cabbages spoiled to throw them overboard in the China Sea, but under no circumstances to do so in Manila Bay, as they would float ashore and the natives would eat them. Some of these may have been smuggled ashore, but I have been unable to prove this, although I am convinced that some smuggling was done from the ships by the natives. The fact remains, however, that the first cases of cholera occurred in the Farola district, a densely populated peninsula between the mouth of the Pasig River and an arm of the bay. Numerous small vegetable shops existed in this district, and here lived many of the stevedores engaged in unloading cargo on the ships, fishermen who ply their vocation on the bay by night as well as by day, and those engaged in petty smuggling. About this time cabbages were also found on the beach, having been thrown overboard by some vessel and drifted ashore.

The board of health immediately instituted rigid measures for suppressing the disease, but on account of the ignorance of the natives and their opposition to the measures enforced, the regulations were not effective, although the epidemic was held in check to an appreciable degree.

At an early date some of the provinces near Manila were infected, and the epidemic has passed through province after province, practically unhindered in its march.

Upon the appearance of cholera in Manila the necessity for protecting the provinces against the introduction of the disease by vessels was apparent, and consequently, on the 21st of March a five days' quarantine was declared on all vessels sailing from Manila for island ports before being allowed to sail. The same regulation was applied to United States Army transports sailing for United States ports, since a large number of troops were being returned at this time. That the latter was a wise measure, not only for the protection of the personnel of the ships, but also for the United States ports, has been demonstrated by the occurrence on board of cases of cholera on most of the transports while serving their five days' quarantine detention. This quarantine has been effective since, although 45 vessels have had cases of cholera occur on board while serving their quarantine here; no vessel has had the disease develop after discharge from quarantine, and no port in the Philippine Islands has been infected by vessels from Manila, with the exception of Nueva Caceres, the latter being infected soon after the appearance of the disease in Manila by a vessel that had been permitted to load in quarantine and sail to Nueva Caceres without the five days' detention. It was afterwards ascertained that some of the crew had communicated with the shore in Manila, one of whom acquired the infection during the visit and developed the disease after the vessel arrived at Nueva Caceres.

The following circular letters were sent to the agents of vessels, and still remain in force:

[Circular letter.]

OFFICE OF THE CHIEF QUARANTINE OFFICER
FOR THE PHILIPPINE ISLANDS,
MARINE-HOSPITAL SERVICE,
Manila, P. I., March 22, 1902.

To the owners and agents of vessels, Manila, P. I.

SIRS: In view of the fact that six suspected cases of cholera have occurred in Manila during the past two days, and in order to prevent the disease being carried to other ports in the Philippine Islands, I have the honor to inform you that all vessels sailing from Manila for other island ports must comply with the following regulations before a bill of health will be granted:

1. The vessel must be thoroughly cleaned; cabins and forecastles must be repainted if necessary, and all cockroaches and vermin killed.
2. All water taken on board for the use of passengers and crew must be boiled.
3. All passengers and crew must have a certificate from the board of health.
4. All food products, vegetables especially, taken as cargo or for consumption on board must be accompanied with a certificate from the board of health.
5. All passengers or crew taken sick during the voyage with cramps or diarrhea must be separated from other persons and not allowed to use the water-closet of the ship. All matter passed by such sick persons must be in urinal, and 5 per cent solution of carbolic acid added in quantity equal to the discharge and kept three hours before throwing overboard. All clothing and bedding soiled by those sick must be immediately boiled.
6. All vessels will anchor in the bay and wait for inspection before bill of health is granted.
7. Captains of ships must keep vessels clean during voyage, and any boat arriving in dirty condition will be sent to Mariveles for disinfection.
8. This order will go into effect immediately and continue in force until further notice.

Respectfully,
J. C. PERRY,
Passed Assistant Surgeon, U. S. M. H. S.,
Chief Quarantine Officer for the Philippine Islands.

[Circular letter.]

OFFICE OF THE CHIEF QUARANTINE OFFICER
FOR THE PHILIPPINE ISLANDS,
MARINE-HOSPITAL SERVICE,
Manila, P. I., March 23, 1902.

To the owners and agents of vessels, Manila, P. I.

SIRS: You are hereby informed that all vessels leaving Manila for other ports in the Philippine Islands will be quarantined for five days before being allowed to sail, and the following rules, in addition to those already promulgated, will be enforced:

All the provisions of previous order of the 22d will be rigidly enforced, except clause No. 3, and the following regulations must be obeyed:

1. All vessels, after loading cargo, and with passengers and crew on board, must proceed into the bay and anchor far over to the right of the usual anchorage for incoming vessels.

2. Must keep ladder raised and fly yellow flag continuously.
3. No one can leave or visit the ship except the quarantine officers.
4. Any violation of the regulations will be met with summary prosecution of the guilty party, and the penalty of fine and imprisonment will be inflicted.
5. In case of emergency, and the necessity of supplying additional water and provisions, permission will be granted for communication under the direction of the quarantine officer.
6. No communication between the different ships will be allowed under any circumstances, and violations of this regulation will make it necessary to detain the vessels an additional five days, in addition to inflicting the penalty on the guilty parties.

This order will go into effect immediately.

Respectfully,

J. C. PERRY,
Passed Assistant Surgeon, U. S. M. H. S.,
Chief Quarantine Officer for the Philippine Islands.

On April 2, the regulations governing the quarantine of vessels from Hongkong were modified as specified below.

[Circular letter.]

OFFICE OF THE CHIEF QUARANTINE OFFICER
FOR THE PHILIPPINE ISLANDS,
MARINE-HOSPITAL SERVICE,
Manila, P. I., April 2, 1902.

The Steamship Agents, Manila, P. I.

SIRS: Relative to the quarantine of vessels and in order to delay the ships as little as possible, I have the honor to inform you that if the following regulations are rigidly enforced in Hongkong under the supervision and to the satisfaction of Assistant Surgeon J. W. Kerr, U. S. M. H. S., the five days' quarantine which is imposed upon vessels arriving from Hongkong can date from the hour of departure:

1. No Asiatic steerage passenger must be brought; Asiatic cabin passengers must be certified to by Assistant Surgeon Kerr.
2. The crew of the vessel must be kept on board while the boat is lying in Hongkong harbor, and not be allowed to go on shore. Chinese foods for the crew must be removed and destroyed before sailing, and fresh food that can be certified to by Doctor Kerr provided.
3. The water in tanks for drinking purposes must be boiled; this can be done by a jet of steam conducted from the boiler.
4. The crew must be disinfected as usual.
5. The forecastles and decks must be washed down with bichloride solution, after being mechanically cleaned.

If, however, sickness of a suspicious character develops en route, these regulations will not apply.

All vessels will call at Mariveles to complete the five days' quarantine.

Respectfully,

J. C. PERRY,
Passed Assistant Surgeon, U. S. M. H. S.,
Chief Quarantine Officer for the Philippine Islands.

On April 29, the quarantine at Manila of vessels arriving from Hongkong was removed under the conditions embraced in the letter embodied herein, since Manila was far more seriously infected with cholera than Hongkong, and the quarantine was a hardship without being of value, as only cabin passengers were landed here, who in all probability would not convey infection.

[Circular letter.]

OFFICE OF THE CHIEF QUARANTINE OFFICER
FOR THE PHILIPPINE ISLANDS,
MARINE-HOSPITAL SERVICE,
Manila, P. I., April 29, 1902.

The Steamship Agents, Manila, P. I.

SIRS: I have the honor to inform you that owing to the continued prevalence of cholera in Manila and the improved conditions in Hongkong, that the quarantine at this port against vessels sailing from Hongkong will be raised on and after May 1, but this does not apply to vessels arriving at other ports of entry in the Philippine Islands, the existing regulations remaining in force at the latter places on account of their remaining free from cholera.

The regulations now in force at Hongkong, promulgated by circular letter of April 2, 1902, must be strictly enforced, and vessels must call as usual at Mariveles for examination and redisinfection.

Vessels from Amoy bringing steerage passengers will be subject to five days' quarantine at Mariveles after disinfection.

However, this raising of quarantine is provisional, and if the disease disappears from Manila while Canton and Hongkong remain infected, the quarantine will be reimposed in order to protect this port.

The regulations relative to food products and prohibited articles of merchandise remain effective.

Respectfully,

J. C. Perry,
Passed Assistant Surgeon, U. S. M. H. S.,
Chief Quarantine Officer for the Philippine Islands.

During the first two weeks in May ships brought steerage passengers from Amoy, although I had suggested the inadvisability of doing so. These vessels were, of course, subjected to a five days' quarantine after disinfection, in order to eliminate the possibility of cholera breaking out among their passengers, plague not having been reported as present in Amoy.

A week later a ship arrived without steerage passengers, but had had a death among the crew from plague, and a few days later another ship arrived with a well-developed case of plague among the few Chinese steerage passengers, which was followed by the occurrence of the second case in a few days. This led to the promulgation of the regulation submitted below:

[Circular letter.]

Office of the Chief Quarantine Officer
for the Philippine Islands,
Marine-Hospital Service,
Manila, P. I., May 29, 1902.

The Steamship Agents, Manila, P. I.

Sirs: In view of the fact that both cholera and plague exist in Amoy, I have the honor to inform you that vessels bringing Asiatic passengers from that port will be subject to fifteen days' quarantine at Mariveles in order to protect this port from the introduction of bubonic plague.

This office does not deem it wise for this class of passengers to be brought during the next few months, and this opinion has been substantiated by the arrival of the steamship *Sung Kiang* with one case of plague among the Asiatic steerage passengers.

If vessels continue to bring this class of passengers from Amoy, it will be necessary to quarantine the entire personnel of the ship at Mariveles for a period of fifteen days. However, the vessel could be released under a new crew and allowed to proceed to Manila, if this should be desired.

Respectfully,

J. C. Perry,
Passed Assistant Surgeon, U. S. M. H. S,,
Chief Quarantine Officer for the Philippine Islands.

Manila has been practically free from plague since the subsidence of the epidemic in the fall of 1901, and a fresh importation has been prevented by the rigid maritime quarantine imposed.

The work accomplished and the disbursements made are submitted in tabulated form, and while some of the figures may seem large, still the work has actually been performed, and I believe a study of the data will establish the fact that Manila has risen to a station of the first importance and that the quarantine work of the Marine-Hospital Service in the Philippine Islands will compare favorably with that executed at the largest ports in the United States or Cuba.

Statistics of quarantine transactions at the port of Manila, P. I., for the fiscal year ended June 30, 1902.

Date.	Vessels inspected from—		Vessels in quarantine.	Vessels disinfected.	Bills of health issued.	Pieces baggage disinfected.	Pieces inspected and passed.
	Foreign ports.	Domestic ports.					
1901.							
July	56	201	1	1	282	3,471	5,167
August	52	173			212	4,287	2,416
September	43	199	1	1	268	3,361	3,947
October	58	180	5	5	233	7,194	2,299
November	44	225	4	4	283	4,551	769
December	58	223	1	20	276	5,405	1,525
1902.							
January	60	189	4	80	256	7,035	1,916
February	50	224	2	21	272	5,828	1,961
March	64	251	21	25	295	3,142	5,969
April	58	204	35	39	226	2,921	842
May	53	199	36	39	242	4,614	104
June	61	173	25	27	223	8,496	214
Total	657	2,441	135	262	3,068	60,305	27,129

Date.	Crew inspected.	Passengers inspected.		Persons vaccinated.		Persons bathed and effects disinfected.	Persons quarantined (suspects).
		Cabin.	Steerage.	Crew.	Passengers.		
1901.							
July	9,634	1,144	7,772	54	1,589		
August	9,601	1,791	6,017	23	963		1
September	9,496	1,466	4,281	130	697	58	58
October	10,023	1,486	11,647	40	8	3,019	51
November	9,877	1,293	8,035			1,071	2
December	10,973	1,254	8,292			477	1
1902.							
January	9,591	1,144	7,634	990	711	2,933	3
February	9,174	1,008	6,963	537	279	1,001	7
March	12,134	1,628	13,475	241	84	4,521	262
April	10,359	1,578	9,486	166	42	4,734	3,274
May	10,948	1,778	12,179	12	8	4,929	3,582
June	10,201	1,777	12,487	30	12	6,737	4,917
Total	122,011	17,347	108,268	2,223	4,393	29,480	12,158

Outgoing quarantine transactions at the port of Manila, P. I., for the fiscal year ended June 30, 1902.

Date.	Vessels inspected.	Vessels in quarantine.	Vessels disinfected.	Vessels remanded to Mariveles.	Ferryboats inspected.	Pieces baggage disinfected.
1901.						
July	223				338	1,575
August	164				366	1,100
September	218				354	1,241
October						
November						
December						
1902.						
January						
February						
March	88	88	11	2		10,649
April	188	188	82	10		8,142
May	231	231	17	13		10,080
June	165	165	10	6		17,621
Total	1,277	672	120	31	1,058	50,408

Outgoing quarantine transactions at the port of Manila, P. I., for the fiscal year ended June 30, 1902—Continued.

Date.	Pieces baggage inspected and passed.	Crew (outgoing) inspected.	Crew quarantined.	Crew ferryboats inspected.	Passengers (outgoing) inspected.	Ferryboat passengers inspected.
1901.						
July		5,448		3,510	3,867	31,625
August		5,707		4,001	3,697	30,216
September		5,664		4,599	3,976	31,943
October						
November						
December						
1902.						
January						
February						
March	6,009	12,707	3,808		18,417	
April	2,924	36,743	9,122		52,998	
May	5,330	29,612	7,610		69,080	
June	4,437	21,709	5,543		60,901	
Total	18,700	117,590	26,083	12,110	212,936	93,784

Date.	Passengers quarantined.		Persons vaccinated.	Bathed and clothing disinfected.	Persons rejected.		Cases quarantined: Diseases among persons in quarantine.		
	Cabin.	Steerage.			Plague suspects.	Fever.	Leprosy.	Smallpox.	Cholera.
1901.									
July					2	6			
August					1	2			
September						1			
October									
November									
December									
1902.									
January									
February									
March	357	6,380	102	66				1	
April	2,926	12,662	84	180			2	3	18
May	4,539	17,383	16	204					15
June	4,530	15,485	22	46					10
Total	12,352	51,910	224	496	3	9	2	4	43

Summary of quarantine transactions at Manila, P. I., during fiscal year ended June 30, 1902.

Vessels inspected	5,433
Vessels held in quarantine	807
Vessels disinfected	382
Bills of health issued	3,068
Pieces of baggage disinfected	110,713
Pieces of baggage inspected and passed	45,809
Cases of quarantinable diseases occurring on vessels quarantined prior to sailing:	
Cholera	43
Smallpox	4
Leprosy	2
Persons desiring to sail, rejected, causes:	
Plague suspects	3
Fever	9
Crew in quarantine	26,083
Passengers in quarantine	64,262
Crew inspected	251,711
Passengers inspected	432,335
Persons vaccinated	6,840
Persons bathed and effects disinfected	29,976
Suspects and contacts in quarantine at Mariveles quarantine station	12,158

Statistics of quarantine transactions at the port of Cebu, P. I., for the fiscal year ended June 30, 1902.

Date.	Vessels inspected from—		Vessels in quarantine.	Vessels disinfected.	Bills of health issued.	Pieces baggage disinfected.	Bags mail disinfected.
	Foreign ports.	Domestic ports.					
1901.							
July	4	78	----------	----------	3	----------	----------
August	2	83	----------	----------	4	----------	----------
September	2	88	----------	----------	3	----------	----------
October	3	92	----------	----------	5	----------	----------
November	2	71	----------	----------	2	----------	----------
December	3	52	----------	----------	3	----------	----------
1902.							
January	4	75	1	1	5	----------	----------
February	3	67	----------	----------	2	----------	----------
March	5	69	----------	----------	5	68	----------
April	6	70	1	1	19	----------	103
May	8	97	----------	----------	39	----------	----------
June	10	93	1	1	48	34	----------
Total	52	935	3	3	138	102	103

Date.	Crew inspected.	Passengers inspected.		Persons held in quarantine.	Persons bathed and effects disinfected.	Crew and passengers vaccinated.	Packages freight refused landing.
		Cabin.	Steerage.				
1901.							
July	2,447	179	814	----------	----------	----------	----------
August	2,438	118	712	----------	----------	----------	----------
September	2,674	141	1,164	----------	----------	----------	----------
October	2,759	86	611	----------	----------	----------	----------
November	2,316	121	821	----------	----------	----------	----------
December	2,469	210	946	----------	----------	----------	----------
1902.							
January	3,196	255	877	----------	----------	----------	----------
February	2,943	173	1,468	----------	----------	----------	----------
March	3,657	200	1,278	----------	----------	----------	----------
April	2,701	180	924	202	333	32	6
May	3,775	303	2,421	----------	----------	2,285	----------
June	2,680	185	984	28	28	1,173	----------
Total	34,055	2,151	13,020	230	361	3,490	6

Statistics of quarantine transactions at the port of Iloilo, P. I., for the fiscal year ended June 30, 1902.

Date.	Vessels inspected from—		Crew inspected.	Passengers inspected.		Bills of health issued.	Crew and passengers vaccinated.
	Foreign ports.	Domestic ports.		Cabin.	Steerage.		
1901.							
July	8	30	1,213	80	204	9	----------
August	----------	21	892	120	473	5	----------
September	2	29	1,651	282	2,401	3	----------
October	2	22	1,119	176	407	3	----------
November	3	27	1,175	171	431	2	----------
December	8	36	1,823	314	304	4	----------
1902.							
January	4	32	1,195	254	635	5	----------
February	7	22	1,577	146	754	3	----------
March	8	23	1,453	384	463	10	----------
April	4	25	820	310	244	4	98
May	6	41	1,655	347	1,472	7	----------
June	9	22	1,211	261	767	12	----------
Total	61	330	15,786	2,845	8,555	67	98

[Financial statement, United States currency basis.]

APPROPRIATIONS.

Act 163, United States Philippine Commission, quarantine service	$73,435.50
Act 264, United States Philippine Commission, quarantine service	52,500.00
Act 311, United States Philippine Commission, quarantine service	664.00
Act 330, United States Philippine Commission, quarantine service	24,400.00
Act 389, United States Philippine Commission, quarantine service	23,250.00
Total appropriated for the quarantine service	174,249.50

Statement of receipts and disbursements for the United States quarantine service for the Philippine Islands during the fiscal year ended June 30, 1902.

DEBITS.

1901.		
July 16.	Received of treasurer Philippine Islands	$10,325.00
Aug. 10.	Received of treasurer Philippine Islands	10,000.00
Sept. 13.	Received of treasurer Philippine Islands	15,600.00
Oct. 25.	Received of treasurer Philippine Islands	18,000.00
Nov. 21.	Received of treasurer Philippine Islands	4,600.00
Dec. 30.	Received of treasurer Philippine Islands	10,400.00
1902.		
Jan. 17.	Received of treasurer Philippine Islands	17,500.00
Feb. 19.	Received of treasurer Philippine Islands	25,000.00
Mar. 6.	Received of Evie J. Ray	13.80
Mar. 22.	Received of treasurer Philippine Islands	17,700.00
Apr. 24.	Received of treasurer Philippine Islands	6,600.00
May 27.	Received of treasurer Philippine Islands	6,000.00
June 19.	Received of treasurer Philippine Islands	4,200.00
June 30.	Received refund for subsistence	83.50
June 30.	Received of Ynchausti y Ca. (subsistence casco crews)	4.92
	Total cash receipts	146,027.22
Dec. 30.	Refund to treasurer unexpended balance, act 163	5,360.00
Mar. 6.	Refund to treasurer, collection, act 330	13.80
Mar. 22.	Refund to treasurer unexpended balance, acts 163, 264	2,477.26
Apr. 1.	Credit by loss in value of Mexican currency, due to change in rate from 2.10 to 2.27	465.07
Apr. 26.	Refund to treasurer unexpended balance, act 264	887.80
		9,203.93
	Balance to be accounted for	136,823.29
		146,027.22

CREDITS—DISBURSEMENTS.

	July.	August.	September.	October.	November.	December.
1901.						
Salaries and wages of personnel	$1,802.10	$1,947.59	$2,260.98	$2,020.97	$1,629.37	$2,908.13
Launch expenses, supplies, and repairs	351.93	354.32	134.21	342.29	1,344.52	490.64
Rents, new construction, and equipment	30.00	80.00	6,055.00	2,555.00	2,055.00	7,240.00
Station supplies and disinfectants	469.10	153.23	323.55	6,611.40	1,208.22	2,745.31
Office and miscellaneous expenses	327.36	366.50	325.54	1,432.76	484.05	417.15
Total	2,980.49	2,901.64	9,099.28	12,962.42	6,721.16	13,801.23

	January.	February.	March.	April.	May.	June.
1902.						
Salaries and wages of personnel	$1,971.23	$2,359.48	$2,262.39	$999.51	$2,413.98	$4,317.65
Launch expenses, supplies, and repairs	1,083.39	347.62	414.45	417.83	460.91	892.97
Rents, new construction, and equipment	5,923.57	6,270.00	24,084.03	8,670.51	332.99	8,832.10
Station supplies and disinfectants	187.69	196.36	323.21	1,338.88	420.92	598.59
Office and miscellaneous expenses	314.53	514.13	329.40	188.67	705.68	754.04
Total	9,480.41	9,687.59	27,413.48	11,615.40	4,334.48	15,395.35

Total disbursements	$126,392.93
Balance, Hongkong and Shanghai Bank	10,430.36
	136,823.29

Expenditures for the quarantine service for the Philippine Islands during the fiscal year ended June 30, 1902.

Details:	
Compensation of personnel	$26,893.38
Stationery, blanks, and printing	245.93
Incidental expenses, general service	6,132.10
Launch supplies and repairs to launches	6,635.08
Station supplies, including disinfectants	7,669.26
New construction and station equipment	78,817.18
Total expenditures	126,392.93

Expenditures by station.

Manila:		
General service expenses	$13,424.81	
Launch expenses	7,247.84	
		$20,672.65
Mariveles:		
General expenses and supplies	15,983.98	
New construction and equipment	47,271.44	
		63,255.42
Cebú:		
General service expenses	2,860.40	
Launch expenses	2,672.18	
Station equipment	15,120.97	
		20,653.55
Iloilo:		
General service expenses	3,081.09	
Launch expenses	2,425.96	
Station equipment	16,304.26	
		21,811.31
Total expenditures		126,392.93

Respectfully submitted.

J. C. PERRY,
Passed Assistant Surgeon, U. S. M. H. S.,
Chief Quarantine Officer for the Philippine Islands.

APPENDIX E.

REPORT OF THE CHIEF QUARANTINE OFFICER FOR JULY, 1902.

OFFICE OF CHIEF QUARANTINE OFFICER,
PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE,
Manila, P. I., September 19, 1902.

The Hon. SECRETARY OF THE INTERIOR, PHILIPPINE ARCHIPELAGO,
Manila, P. I.

SIR: I have the honor to hereby submit report of the quarantine service in the Philippine Islands for the month of July, 1902.

The work has continued heavy during this period since the cholera epidemic has remained severe. However, the only event of unusual importance has been the wreck of the disinfecting barge for Cebu.

The barge was dispatched during fine weather on the 12th of July in tow of the S. S. *Antonio Macleod* for Cebu, but a sudden and extremely severe typhoon was encountered en route and the barge broke adrift north of the island of Tablas on the morning of the 14th and stranded on the beach of Marinduque Island, near Gasan, on the same date.

The barge was considerably damaged, but was floated and towed to Banalacan Bay for safe anchorage. However, here it filled through some open seams and sank. A contract has been awarded for floating and repairing the barge, and it is expected to have it ready for dispatching to Cebu at an early date.

The work accomplished and disbursements made are submitted below.

Quarantine transactions, United States quarantine service for the Philippine Islands, during the month of July, 1902.

PORT OF MANILA.

Bills of health issued:	
To United States ports	4
To foreign ports	49
To domestic ports	136
Total	189

Number of vessels inspected:	
From foreign ports	55
From domestic ports	182
Total	237
Number of passengers on arriving boats inspected:	
Cabin	1,375
Steerage	8,183
Total	9,558
Number of crew of arriving boats inspected	9,821
Number of persons quarantined for observation (suspects and contacts)	4,472
Number of persons bathed and effects disinfected	3,797
Number of persons vaccinated:	
Crew	46
Passengers	28
Total	74
Number of vessels remaining in quarantine from June	4
Number of vessels in quarantine	44
Number of infected vessels disinfected	42
Number of vessels disinfected for killing rats	1
Number of vessels remaining in quarantine July 31	2
Number of pieces of baggage disinfected and so labeled	10,105
Number of pieces of baggage inspected and passed	64

OUTGOING QUARANTINE.

Number of vessels remaining in quarantine from June	21
Number of vessels entering quarantine during the month	133
Number of vessels discharged from quarantine	146
Number of vessels disinfected	2
Number of vessels remanded to Mariveles quarantine station	16
Number of vessels remaining in quarantine 7 p. m., July 30	8
Number of crew quarantined	5,206
Number of cabin passengers quarantined	2,988
Number of steerage passengers quarantined	13,820
Number of crew inspected	21,486
Number of passengers inspected	50,964
Number of cases of quarantinable diseases occurring among persons in detention, cholera	18
Number of pieces of baggage disinfected and so labeled	21,750
Number of pieces of baggage inspected and passed	3,041

SUMMARY OF TRANSACTIONS AT MANILA.

Total number of vessels remaining in quarantine from June	25
Total number of vessels entering quarantine	173
Total number of vessels in quarantine	198
Total number of vessels inspected	388
Total number of vessels disinfected	45
Total number of vessels remaining in quarantine July 31	10
Total number of bills of health issued	189
Total number of crew and passengers in quarantine	26,486
Total number of crew inspected	31,307
Total number of passengers inspected	60,522
Total number of persons bathed and effects disinfected	4,472
Total number of persons vaccinated	74
Total number of pieces of baggage disinfected	31,856
Total number of pieces of baggage inspected and passed	3,105

PORT OF CEBU.

Bills of health issued:	
To United States ports	0
To foreign ports	3
To domestic ports	57
Total	60

Number of vessels inspected:	
From foreign ports	4
From domestic ports	60
Total	64
Number of passengers inspected:	
Cabin	141
Steerage	712
Total	853
Number of crew inspected	1,865
Number of persons quarantined for observation (suspects and contacts)	60
Number of persons vaccinated	700
Number of vessels in quarantine	3
Number of vessels held five days for observation	170
Number of vessels disinfected	9
Number of passengers held five days for observation	445
Number of crews held five days for observation	1,507
Number of pieces of baggage disinfected	115
Number of cases of cholera on vessels in quarantine	1
Number of cases of cholera on vessels not in quarantine	9

PORT OF ILOILO.

Number of bills of health issued	12
Number of vessels inspected:	
From foreign ports	3
From domestic ports	33
Total	36
Number of passengers inspected:	
Cabin	159
Steerage	275
Total	434
Number of crew inspected	1,166

Account current, supplemental to fiscal year 1902, for the month of July, 1902.

[United States currency.]

DEBITS.

July 1. Balance from June account current	$10,430.36	
July 1. Received of J. D. Carter, refund for subsistence furnished	32.50	
		$10,462.86

CREDITS.

Vouchers:		
1. Fernando Zobel, permanganate of potash, June		$30.00
2. Gan Suico, sacks		28.00
3. E. G. Shields, insular purchasing agent, coal		837.01
5227. Treasurer Philippine Islands, refund unexpended balance		88.42
5503. Treasurer Philippine Islands, refund unexpended balance		2,543.54
5502. Treasurer Philippine Islands, refund unexpended balance		.04
Total credits		3,527.01
Balance:		
Mexican, at $2, $2,826.78 United States	$1,413.39	
Mexican, at $2.27, $3,766.90 do	1,659.43	
United States currency do	3,863.03	
		6,935.85
Total balance, expressed in United States currency		10,462.86

Account current for the month of July, 1902, fiscal year 1903.

[Mexican currency, act 430.]

DEBITS.

July 29. Received A. W. 1676, treasurer P. A		$23,500.00

CREDITS.

Vouchers:		
1. Asa F. Fisk, commissary, P. C., groceries	$64.39	
2. Asa F. Fisk, commissary, P. C., groceries	180.25	
3. Lim Chiatchon, groceries	43.20	
4. J. W. Amesse, assistant surgeon, Marine-Hospital Service, commissary quarters, July	188.00	
5. Eastern Extension Australia and China Telegraph Company, Limited, telegrams	5.88	
Total disbursements, Mexican currency	481.72	
Balance on deposit Hongkong and Shanghai Bank	23,018.28	
		23,500.00

The Mexican currency embraced in this account current was received and disbursed at the rate of $2.35 Mexican currency for $1 United States currency.

Respectfully submitted.

J. C. Perry,
Passed Assistant Surgeon, B. H. & M. H. S.,
Chief Quarantine Officer for the Philippine Islands.

Appendix F.

REPORT OF THE CHIEF QUARANTINE OFFICER FOR AUGUST, 1902.

Office of Chief Quarantine Officer
Public Health and Marine-Hospital Service,
Manila, P. I., September 22, 1902.

The honorable Secretary of the Interior Philippine Archipelago,
Manila, P. I.

Sir: I have the honor to submit the usual tabulated form report of the quarantine transactions in the Philippine Islands for the month of August, 1902.

During the month, the wharf at Mariveles quarantine station was damaged by the transport *Sherman.* The vessel, in docking, struck the north end of the wharf bow on, driving one of the cluster of fender piles 15 feet into the main body of the wharf, breaking a number of piles, bracing, and considerable of the docking, and pushing that portion of the structure out of the vertical and toward the reservation.

The amount of damage done is estimated at $6,800 gold, and since it was done through carelessness or faulty handling of the transport, claim has been made on the quartermaster department for this amount, or to repair the wharf so as to make it the same as before the accident.

Quarantine transactions United States quarantine service for the Philippine Islands, during the month of August, 1902.

PORT OF MANILA.

Bills of health issued:	
To United States ports	8
To foreign ports	42
To domestic ports	138
Total	188
Number of vessels inspected:	
From foreign ports	46
From domestic ports	149
Total	195

Number of passengers on arriving boats inspected:	
Cabin	1,024
Steerage	3,470
Total	4,494
Number of crew of arriving boats inspected	8,218
Number of persons quarantined for observation (suspects and contacts)	1,500
Number of persons bathed and effects disinfected	2,546
Number of persons vaccinated:	
Crew	88
Passengers	6
Total	94
Number of vessels remaining in quarantine from July	2
Number of vessels in quarantine	24
Number of infected vessels disinfected	24
Number of vessels disinfected for killing rats	1
Number of vessels remaining in quarantine August 31	4
Number of pieces of baggage disinfected and so labeled	4,876
Number of pieces of baggage inspected and passed	106

OUTGOING QUARANTINE.

Number of vessels remaining in quarantine from July	8
Number of vessels entering quarantine during the month	91
Number of vessels sailing for infected ports without quarantine inspected and passed	72
Number of vessels discharged from quarantine	91
Number of vessels disinfected	1
Number of vessels remanded to Mariveles quarantine station	9
Number of vessels remaining in quarantine 7 p. m., August 31	8
Number of crew quarantined	5,450
Number of cabin passengers quarantined	2,245
Number of steerage passengers quarantined	7,858
Number of crew inspected	15,792
Number of passengers inspected	30,110
Number of cases of quarantinable diseases occurring among persons in detention, cholera	7
Number of pieces of baggage disinfected and so labeled	7,199
Number of pieces of baggage inspected and passed	1,352

SUMMARY OF TRANSACTIONS AT MANILA.

Total number of vessels remaining in quarantine from July	10
Total number of vessels entering quarantine	115
Total number of vessels in quarantine	123
Total number of vessels inspected	366
Total number of vessels disinfected	26
Total number of vessels remaining in quarantine August 31	12
Total number of bills of health issued	188
Total number of crew and passengers in quarantine	18,099
Total number of crew inspected	24,010
Total number of passengers inspected	34,604
Total number of persons bathed and effects disinfected	2,546
Total number of persons vaccinated	94
Total number of pieces of baggage disinfected	12,057
Total number of pieces of baggage inspected and passed	1,458

PORT OF CEBU.

Bills of health issued:	
To United States ports	**0**
To foreign ports	**5**
To domestic ports	**86**
Total	**91**

Number of vessels inspected:	
From foreign ports	4
From domestic ports	89
Total	93
Number of passengers inspected:	
Cabin	176
Steerage	633
Total	809
Number of crew inspected	2,679

OUTGOING QUARANTINE.

Number of vessels remaining in quarantine from last month	24
Number of vessels entering quarantine during the month	115
Number of vessels released from quarantine during the month	133
Number of vessels remaining in quarantine at the end of the month	6
Number of vessels disinfected	8
Number of vessels cleared for infected ports without detention	25
Number of passengers remaining in quarantine from last month:	
Cabin	1
Steerage	25
Total	26
Number of passengers entering quarantine during the month:	
Cabin	52
Steerage	415
Total	467
Number of passengers released from quarantine during the month:	
Cabin	48
Steerage	408
Total	456
Number of passengers remaining in quarantine at the end of the month:	
Cabin	5
Steerage	32
Total	37
Number of passengers inspected	3,310
Number of crews remaining in quarantine from last month	277
Number of crews entering quarantine during the month	1,601
Number of crews released from quarantine during the month	1,771
Number of crews remaining in quarantine at the end of the month	107
Number of crews inspected	7,962
Number of pieces of baggage disinfected	164
Number of pieces of baggage inspected and passed	239
Number of cases of cholera on vessels in quarantine	5
Number of cases of cholera on vessels not in quarantine	6

SUMMARY OF TRANSACTIONS AT CEBU.

Total number of vessels remaining in quarantine from July	24
Total number of vessels entering quarantine	115
Total number of vessels in quarantine	139
Total number of vessels inspected	257
Total number of vessels discharged from quarantine	115
Total number of vessels disinfected	8
Total number of vessels remaining in quarantine August 31	6
Total number of bills of health issued	91

Total number of crew and passengers in quarantine	2,371
Total number of crew inspected	10,641
Total number of passengers inspected	4,119
Total number of pieces of baggage disinfected	164
Total number of pieces of baggage inspected and passed	239

PORT OF ILOILO.

Bills of health issued:	
To foreign ports	7
To domestic ports	6
Total	13
Number of vessels inspected:	
From foreign ports	9
Fom domestic ports	83
Total	92
Number of passengers on arriving boats inspected:	
Cabin	330
Steerage	710
Total	1,040
Number of crew of arriving boats inspected	1,963
Number of persons quarantined for observation (suspects and contacts)	366
Number of persons bathed and effects disinfected	148
Number of vessels in quarantine	15
Number of infected vessels disinfected	5
Number of vessels remaining in quarantine August 31	5
Number of pieces of baggage disinfected and so labeled	192
Number of pieces of baggage inspected and passed	44

OUTGOING QUARANTINE.

Number of vessels entering quarantine during the month	48
Number of vessels discharged from quarantine	25
Number of vessels disinfected	6
Number of vessels sailing for infected ports without quarantine inspected and passed	2
Number of vessels remaining in quarantine August 31	23
Number of crew quarantined	362
Number of cabin passengers quarantined	26
Number of steerage passengers quarantined	142
Number of crew inspected	1,746
Number of passengers inspected	714
Number of persons bathed and body clothing disinfected	64
Number of cases of cholera occurring among persons in detention	4
Number of pieces of baggage disinfected and so labeled	412
Number of pieces of baggage inspected and passed	32

SUMMARY OF TRANSACTIONS AT ILOILO.

Total number of vessels remaining in quarantine from July	0
Total number of vessels entering quarantine	63
Total number of vessels in quarantine	63
Total number of vessels inspected	94
Total number of vessels disinfected	11
Total number of vessels remaining in quarantine August 31	28
Total number of bills of health issued	13
Total number of crew and passengers in quarantine	896
Total number of crew inspected	3,709
Total number of passengers inspected	1,754
Total number of persons bathed and effects disinfected	212
Total number of pieces of baggage disinfected	604
Total number of pieces of baggage inspected and passed	76

Account current for the month of August, 1902, supplemental to fiscal year 1902.

[United States currency.]

DEBITS.

August 1.	Balance from July account current	$6,935.85	
August 1.	Refund, disbursement disallowed	11.25	
August 1.	Rubiano Daluz, refund for subsistence	4.80	
August 5.	E. A. Smith, refund for subsistence	14.00	
August 9.	Received A. W. 1769, treasurer, P. A	1,430.10	
	Total debits		$8,396.00

CREDITS.

Vouchers:			
1.	E. G. Shields, insular purchasing agent, tools, barges	$70.77	
2.	San Nicolas Iron Works, Limited, turnbuckles	98.04	
3.	Manuel Earnshaw & Co., labor on *Esmeralda*	278.14	
4.	Delmar W. Smith, labor on *Proteccion*	342.00	
5.	Mariano Uy Chaco, tools for installing plants	22.00	
6.	Mariano Uy Chaco, hardware and pipe fittings	113.00	
7.	Philippines Cold Stores, Limited, meats, June	15.97	
8.	United States Marine-Hospital Service, groceries, February	393.01	
9.	Kny Scheerer Co., formaldehyde and packing	$1,252.50	
10.	B. W. Cadwaller & Co., lumber for bracing	55.80	
6181.	Treasurer Philippine Archipelago, refund unexpended balance	30.05	
	Total disbursements	2,662.28	
	Balance on hand, Hongkong and Shanghai Bank	5,733.72	
			$8,396.00

Account-current for the month of August, 1902, fiscal year, 1902.

[Mexican currency, act 430.]

DEBITS.

Aug. 1.	To balance from July account-current	$23,018.28	
Aug. 23.	To refund, subsistence furnished	95.00	
Aug. 23.	To warrant, 1795, Treasurer Philippine Archipelago	14,100.00	
	Total debits		$37,213.57

CREDITS.

Vouchers:		
1.	George H. Zantner, canvas duck for repairs	$20.00
2.	J. C. Perry, passed assistant surgeon, commutation for quarters, July	199.75
3.	Pay roll, Manila, officers and attendants, July	2,455.78
4.	Pay roll, Manila, laborers	50.00
5.	V. Resureccion, forage, July	10.00
6.	E. G. Shields, insular purchasing agent, lumber	1,357.32
7.	Enrique Rodriquez, rent office, July	94.00
8.	Sociedad de los Telefonce de Manila, services, July	8.00
9.	Asa F. Fisk, commissary, P. C., groceries	264.49
10.	Pay roll, Mariveles, officer and attendants, July	1,973.28
11.	H. A. Stansfield, assistant surgeon, commutation for quarters, July	188.00
12.	Pay roll, Cebu, officer and attendants, July	945.42
13.	Pay roll, Iloilo, officer and attendants, July	616.42
14.	Asa F. Fisk, commissary, P. C., groceries	124.40
15.	V. Resureccion, forage, August	5.00
16.	Philippines Cold Stores, Limited, fresh meats	371.75

Vouchers:

17.	George W. McCoy, assistant surgeon, traveling expenses	$121.45	
18.	Yap Anton, iron pans, Cebu, July	6.00	
19.	Ramon Maluenda, chairs, Cebu, July	25.00	
20.	Lizarraga Hermanos, tools, launch, Cebu, July	15.75	
21.	Lizarraga Hermanos, sundries, launch, Cebu, July	107.15	
22.	Smith, Bell & Co., coal for launch, Cebu, July	240.00	
23.	J. C. Perry, passed assistant surgeon, commutation for quarters, August	199.75	
24.	Pay roll, Manila, laborers, August	36.00	
25.	Tan Mi, subsistence stores	18.75	
26.	George W. McCoy, assistant surgeon, commutation for quarters, part August	18.80	
27.	J. C. Perry, reimbursement transportation expenses	29.60	
28.	H. A. Stansfield, assistant surgeon, commutation for quarters, August	188.00	
29.	Pay roll, Cebu, officer and attendants, August	1,027.64	
30.	Pay roll, Manila, officers and attendants, August	2,832.48	
31.	J. W. Amesse, assistant surgeon, commutation for quarters, August	188.00	
32.	Enrique Rodriquez, rent office, Manila, August	94.00	
33.	Lo Gioco, forage, July and August	25.00	
34.	Manuel Earnshaw & Co., boat hook	6.00	
35.	Manuel Earnshaw & Co., repairs to launch *Zapote*	203.43	
36.	Luis R. Yangco, rice	269.50	
37.	Pay roll, Mariveles, officer and attendants, August	1,952.14	
38.	Sociedad de los telefonos de Manila, service, August	8.00	
6180.	Treasurer, Philippine Archipelago, refund of refund	95.29	
	Total disbursements	16,391.34	
	Balance on deposit, Hongkong and Shanghai Bank	20,822.23	
			$37,213.57

The Mexican currency embraced in this account-current for the month of August, 1902, fiscal year 1903, was received and disbursed at the rate of $2.35 Mexican currency for $1 United States currency.

Respectfully submitted.

J. C. Perry,
Passed Assistant Surgeon, P. H. & M. H. S.,
Chief Quarantine Officer for the Philippine Islands.

APPENDIX G.

REPORT OF THE ATTENDING PHYSICIAN AND SURGEON FOR CIVIL OFFICERS AND EMPLOYEES FOR THE YEAR ENDING AUGUST 31, 1902.

MANILA, *September 15, 1902.*

Hon. DEAN C. WORCESTER,
Secretary of the Interior, Manila, P. I.

SIR: I have the honor to report that this bureau was originally established on August 4, 1901, with a dispensary and small operating room for furnishing medical and surgical attendance to civil officers and employees. Four rooms were set aside at the palace for this purpose, and the necessary equipment and medicines were ordered. Within a very short time it was demonstrated that it was necessary to establish a hospital as well as a modern operating room for civil officers and employees, not only because the military hospitals were closed to them, but because it was necessary to have a place for the care of the families and women employees of the civil service. A law was then passed for the establishment of a hospital, and two buildings were secured at No. 791 Calle Iris. The army was requested to sell the materials for the furnishing and fixtures of a 100-bed hospital, and these were delivered about October 1, 1901. The main hospital building is two stories high and about 140 feet in length. When the building was taken over it was in a very unsanitary and uncleanly condition. There is a smaller building near the entrance to the compound which was at first used as quarters for the nurses employed, but proving too small and the necessity arising for quarters for the ward attendants, a building was secured at No. 53 Calle Concordia for the nurses, and the small building in the hospital compound was turned over to the ward attendants, superintendent, and house surgeon.

The hospital was painted inside and out and an operating room was established at the end of the L, where ample light and ventilation could be obtained. The floor and sides of this room were tiled and the walls and ceiling enameled. The room was furnished with modern plumbing, the flooring being so arranged that it could be flushed. The room is lighted with 16 electric lights, 32-candlepower each, arranged 3 feet below the ceiling. Over the operating table is a cluster of 4 lights under a reflector, and in addition to these is a single cable lamp for use in case of necessity. The room next to the operating room is fitted as a surgical dressing room and is connected by a door with the operating room. At the other end of the main building the toilet and bathrooms are arranged. The men's department has two toilets, a urinal, a shower and tub bath in a separate room, and three additional shower baths in a separate room, all with modern, open plumbing. The different entrances to the building have tiled floors, the walls and ceiling being enameled so that they can be easily cleaned and kept clean. In the extension at the rear of the main building there were established a full-diet and and a light-diet kitchen. Next to this is the main dining hall, having a seating capacity of 40. The main ward on the upper floor has 26 beds and is sufficiently large to accommodate 40 patients. A large sala in front of this is an excellent recreation hall, and the balcony gives additional space for convalescents. At the northern end of the building, off from the main sala, there are five rooms used as wards and private rooms for women. These rooms open into a well-lighted hall, at the end of which is the entrance to the women's bath and toilet. Next to the surgical dressing room are three large rooms used as private rooms for men and capable of accommodating 4 patients each. The dispensary and offices are located on the first floor of the L. On the first floor of the building is located an extensive ward capable of accommodating 100 patients. At the rear of this ward are closets and two toilet rooms, one with 1 toilet and the other with 2. There are also a clothing and a storeroom.

It was necessary to have lights installed and water runs extended over the property and a tank erected over the kitchen to insure sufficient water pressure for the building.

The building of the toilets, operating, and storerooms was accomplished by November 15, but the flooring of the operating room was cracked and damaged several times by slight seismic disturbances, which necessitated repairing. In the installation of the hospital there was much to be contended with. In the first thirty days there were but one nurse, a dispensing clerk, and the ward attendants, and the arrangement of beds, supplies, etc., was not nearly accomplished when necessity arose for the admission of patients. For sixty-five days the management of the hospital was handicapped by the lack of nurses and attendants, but eventually it secured a sufficient number.

The question of the proper disposal of sewage was a most important one, as there is no sewer system in Manila. It was necessary to arrange for a water-tight cesspool which could be pumped out daily and the refuse carted away. Appropriation was made and the matter was referred to the insular architect. All the toilets, baths, and sinks now empty into three concrete cesspools, situated 200 yards in the rear of the hospital, which are regularly emptied by the City Odorless Excavating Company. As it was not possible to obtain from the military authorities many of the articles necessary for the complete equipment of a modern hospital, and as much of that which was obtained had seen considerable service, particularly the beds, it was necessary to order in the United States the remainder of the furniture and equipment needed. A rubber-tired ambulance was also ordered. When this equipment, which is expected daily, arrives, the Civil Hospital will have the most modern operating room in the Orient.

I desire to call particular attention to the nurses connected with this institution. All of them were graduated from some recognized training school and all have had at least two years' service in military hospitals, in addition to various civil hospitals in the United States. The dietist in charge of the kitchen I particularly commend, as in the tropics a constant care in the proper preparation of diets and foods is absolutely necessary. Especially has it been necessary during the life of this institution, which has seen one epidemic of bubonic plague and is now passing through an epidemic of cholera. The hospital's splendid record of but one death from dysentery is largely due to the care, selection, and preparation of the food, all of which is purchased in open market by the dietist.

In May, 1902, it became necessary to secure a separate building to be used as an isolated pavilion for the care of patients suspected of having smallpox, measles, bubonic plague, or cholera until diagnoses could be determined. There being no place suitable for this in the main building the house on the left of the entrance to the hospital grounds was rented and is now used as a venereal ward, with an L for the cases suspected of being affected with the diseases named. The wisdom of this move was rapidly proven, and since the opening of this annex there have been 3 cases of measles, 4 of smallpox, and 22 cholera suspects. The three buildings secured are within one inclosure and the hospital grounds can be readily and easily beautified.

The hospital is situated in one of the widest streets in the city, and though the grounds are low it is one of the coolest locations in Manila, with the possible exception of the bay shore. There are small holes or buffalo wallows near the hospital building which form great mosquito-breeding beds, but owing to the unusual amount of work that the suppression of cholera has entailed on the board of health, it has thus far been impossible to have these breeding beds removed. While the hospital building is not pleasant to the eye, it has lent itself to the purpose surprisingly well, and it has been possible to secure in the highest degree those cardinal hospital virtues, immaculate cleanliness, good nursing, and perfect diet.

While the institution was founded as a hospital for civil government employees and their families, in formulating the rules of admission humanity demanded the admission of emergency cases and the care of them until they convalesced sufficiently to admit of removal. These cases have added severely to the work of the institution for the reason that the name "civil" was misunderstood for "citizen," and cases were presented from all parts of the city and provinces which were not emergency cases. The "beach combers" learned that the accommodations were good, and consequently the superintendent was kept busy in preventing the hospital from becoming a "home for tramps" and chronic alcoholics. While considerable expense was incurred in inaugurating this institution, still the great majority of the money was expended for furniture, instruments, and equipment which will last years and can be removed to another building. The average expenses per month for running the hospital, including the boarding of the nurses, attendants, house surgeon, and an average of six laboratory attendants, but not including the salaries of the attending surgeon and the assistant attending surgeon, has been about $4,320.04 gold. This is not greater than the average cost of running hospitals in the different parts of the United States, where food and supplies can be purchased at a much less cost than here, and where the addition of training schools lessens the cost of nursing.

Following is given the yearly expense for running several of the most prominent hospitals in the United States:

New York Hospital, Smith Memorial, 100 beds, $25,878.
New York Hospital, St. Marks, 87 beds, $30,900.
Philadelphia Hospital, German, 100 beds, $35,065.
Philadelphia Hospital, Howard, 40 beds, $20,139.
Philadelphia Hospital, Jewish, 63 beds, $77,300.
Philadelphia Hospital, Episcopal, 75 beds, $36,728.
Rhode Island Hospital, Providence, 100 beds, $45,260.
Maine Hospital, 92 beds, $49,771.
St. Louis Hospital, 50 beds, $18,663.
San Francisco Hospital, French, 80 beds, $69,030.
San Francisco Hospital, German, 100 beds, $59,259.
Scranton, Pa., Hospital, 84 beds, $25,726.
Scranton, Pa., Hospital, Country, 58 beds, $19,443.
Washington, D. C., Garfield, 128 beds, $40,865.
Wilkesbarre, Pa., City, 100 beds, $26,436.

It should be added that the New York Lying-in Hospital of 75 beds has 75 attendants. It may seem that the civil hospital's average of 80 or 90 patients would require less attention and fewer attendants, but our method of treating dysentery alone shows the necessity for a continuation of present arrangements, as one case of dysentery is given high quinine enemas every two hours. This means that in the additional calls for bed pans and the administration of nourishment and medicine there is necessity for almost constant attendance on the part of the nurse. I do not know or believe that this constant care obtains in all hospitals where dysentery is treated, but since the inauguration of the civil hospital until now there has been only one death from dysentery, either acute, chronic, or amœbic. One hundred and twelve dysentery cases were treated, of which 36 were amœbic.

This record is considered a splendid one in view of the high death rate in other tropical hospitals. I desire especially to commend the work of the chief nurse, Miss Julia M. Betts, whose great care in selecting the nurses and in the performance of her manifold duties pertaining to the department over which she has charge was of incalculable value in starting the institution, and has added greatly to its reputation.

Until the 6th of May, 1902, it was impossible to secure a house surgeon, and all night calls, emergency calls, etc., until that day were answered by the attending surgeon and the assistant attending surgeon.

Since the establishment of the hospital 1,428 patients have been admitted. Of these, 1,138 were white and 290 Filipinos. The total number of days spent in the hospital by these 1,428 patients was 13,053. As each patient was seen twice each day by the attending physician, the number of calls he has made in the hospital reaches the total of 26,106. There have been treated as "sick in quarters" civilian officers and employees and their families to the number of 2,410. The number of calls made on these patients by the attending physician and surgeon and the assistant attending physician and surgeon has been about 5,475. In all, 3,838 patients have been treated, with 13 deaths, the mortality percentage being 0.03; of these, however, 8 were emergency cases in dying condition when admitted—4 medical cases being really the mortality list, making a real percentage of mortality of 0.01.

There have been filled in the hospital dispensary between October 1, 1901, and September 1, 1902, 3,935 prescriptions. This principally represents outside prescriptions only, as prescriptions for patients in the hospital are filled from the "stock book." There have been issued for use in the provinces to the bureau of non-Christian tribes, mining, forestry, education, and agriculture about $100 worth of drugs.

I recommend the erection of a modern hospital of 200 beds, which shall have at least 25 private rooms, to be according to the most modern aseptic principles. The sooner this is secured the better, for the reason that the government will save $12,000, Mexican currency, a year that is now being paid in rent. Should it not be deemed advisable to build within a year or so, I recommend that shower baths be built at the rear of the lower ward in the present hospital, and also recommend the addition of toilets and baths on the upper floor behind the balcony; also that the surgical dressing room be tiled as is the operating room.

I respectfully recommend that a training school for Filipino nurses and ward attendants be established at once, particularly that for the nurses, and that four be secured at once as an experiment to determine the adaptability of the Filipino girl to this work. For the present it would not be feasible for the women to stay at the hospital at night, owing to the lack of accommodation, but they could report each morning and return home each night until arrangements could be perfected.

I suggest that it is imperative that the best class of women possible be secured, and to this end recommend that one of the qualifications for admission be a recommendation from one or more of the members of the Philippine Commission. I would recommend that the probationer be paid a small salary, after the first month, of $5 or $7 gold; that she receive instructions as to modern nursing from the chief nurse and the nurses under her; a certain training under the dietist, and, as far as practicable, instruction from the surgeon and house surgeon; that she be between 17 and 25 years of age, and if found proficient at the end of two years be granted a certificate signed by the officers of this bureau.

I respectfully recommend the employment of an additional dispensing clerk. Inasmuch as a great number of prescriptions are presented at night, it has become necessary for the dispensing clerk to stay on duty continuously.

Following is a report from the assistant attending physician and surgeon:

H. Eugene Stafford, M. D.,
Attending Physician and Surgeon, Civil Hospital.

Sir: In compliance with your request for a report on my work, I have the honor to state that since the establishment of this department by act of the Philippine Commission on August 7, 1901, I have visited on an average 10 patients per day, scattered through the districts of Trozo, Binondo, Santa Cruz, Quiapo, Sampaloc, San Miguel, Ermita, Malate, Paco, Santa Ana, Santa Mesa, and old Manila. The various diseases for which I attended comprise the following:

Dysentery, amœbic	20	Synovitis	2
Dysentery, acute	30	Insomnia	10
Diarrhea, acute	100	Melancholia	1
Indigestion, acute and chronic	25	Cholera suspects	3
Liver torpidity	30	Gonorrhea, male and female	40
Diarrhea, chronic	15	Chancroids	20
Pleurisy	3	Chancres	5
Pneumonia	2	Orchitis, venereal and nonvenereal	25
Tonsilitis	14	Syphilis, tertiary stage	6
Dengue	60	Wounds, accidental	15
Rheumatism, muscular	25	Wounds, poisoned	3
Rheumatism, articular	15	Burns and scalds	5
Cystitis, acute	6	Boils	20
Hemorrhoids, protruding	10	Skin eruptions, tropical	100
Phthisis	3	Births	3
Mumps	3	Miscarriages	5
Measles	6	Prolapsus of womb	3
Conjunctivitis, acute	3	Ulcerations of womb	10
Neuralgia	2	Flores Blanco	50

These diseases have not been confined to any particular district or class of people. The new arrivals have been more prone to dengue and skin eruptions than the old residents. Many of the cases of diarrhea were among the employees of the department of instruction who arrived during the wet season, and many of the cases of dysentery in the other departments were the result of bad cooking, etc.

Respectfully,

Charles Fitzpatrick, M. D.,
Assistant Attending Physician and Surgeon, Civil Officers and Employees.

Surgical cases.

Diagnosis.	Number patients treated to September 1, 1902.
Abscess:	
Ankle, left	2
Axilla, right	4
Elbow, left	11
Face	1
Face and side	1
Feet, both	1
Foot, right	1
Foot, left	1
Hand, left	3
Jaw, upper right	1
Leg, left	2
Liver	4
Muscle, gluteal	1
Muscle, pectoralis major	1
Perineal	1
Thigh, left	3
Thigh and shoulder	3
Vulva	1
Adenosis:	
Nonspecific, right	1
Nonspecific, left	2
Amputation:	
Arm, right, at shoulder	1
Hand, right	1
Thumb of right hand	1
Bubo	25
Burns:	
Carbolic, entire body	1
Electric, arm, right; hand, left; and buttocks	1
Oil, entire body	1
Cancer, left breast	1
Cellulitis:	
Arm and hand, right	1
Hand	1
Leg, left lower, and instep	1
Leg, knee, and instep, left	1
Circumcision	9
Contusions:	
Ankle, left	1
Back	2
Breast	1
Forearm, left	2
Head, left side, with hemorrhage at base of brain	1
Hip, left	1
Leg, right	2
Leg, left	1
Left leg, with slight flesh wound	1
Side, right	1
Fistula	7
Foreign bodies in eye	8
Furunculosis:	
Buttocks	9
Multiple	6
Neck, left side	2
Fractures:	
Clavicle, right	2
Clavicle, left	2
Little finger, right hand	1
Jaw, lower	1
Joint, radius	1
Skull	1
Hemorrhoids	15
Hemorrhage:	
Base of brain	1
Bronchial	2
Nasal	3
Infection:	
Foot, right	1
Foot, left	1
Heel	1
Thigh	1
Great toe	1
Wounds, gunshot:	
Right chest, perforating	1
Left chest, perforating	1
Right foot	1
Right hand	1
Right hand, infected	1
Left leg	2
Shoulder, perforating spinal column	1
Wound:	
Stab, chest	10
Bolo cut, left hand, severing two fingers	1
Stab, left hand	1
Stab, head	1
Left leg	2
Stab, with incised wound below knee	1
Stab, scalp	1
Stab, left side	4
Stab, right side	1
Bolo cut, from left lower corner of mouth through cheek, ear, and mastoid	1

Medical cases.

Diagnosis.	Number patients treated to September 1, 1902.	Diagnosis.	Number patients treated to September 1, 1902.
Alcoholism	21	Insomnia	2
Amemorihoe	3	Iritis	2
Arthritis	1	Jaundice	7
Articano	1	Keratitis ulcerative	5
Asthma, acute	2	Laryngitis:	
Biliousness	3	Acute	6
Beriberi	6	Chronic	2
Bronchitis	64	Lumbago	2
Cancer of neck	1	Malaria:	
Carbuncle	2	Aestevo-autumnal	5
Catarrh, nasal	6	Quotidian	45
Chancre	3	Tertian	3
Cholera suspects	22	Measles	3
Cocaine habit	1	Miscarriage	2
Concussion of brain	1	Mucoidal colitis	5
Confinement	8	Nervous prostration	15
Constipation	22	Neuritis, acute	1
Convulsions	3	Neuralgia, facial	2
Cramps		Neurasthenia	12
Cystitis	2	Orchitis	48
Dacryocystitis	1	Otitis media:	
Delirium	2	Both ears	4
Dengue	706	Suppurating, chronic	1
Dhobi itch	60	Suppurating, acute	1
Diarrhea:		Ozena	1
Acute	80	Paralysis	9
Chronic	19	Periosteitis, left tibia	1
Dysentery:		Pharyngitis	3
Acute	60	Pleurisy	2
Chronic	16	Pregnancy	2
Eczema	1	Prolapsus uteri	1
Edema	2	Phthysis, pulmonary	4
Endometritis	1	Pneumonia	7
Epilepsy	1	Quinsy	2
Erysipelas	1	Rheumatism	52
Fistula, rectal	20	Sprain	7
Furunculosis	1	Sprue	1
Gastritis, acute	39	Stricture	5
Gastro-enteritis:		Suppression of urine	2
Acute	100	Synovitis of knee	2
Chronic	14	Syphilis	3
Gonorrhea	27	Tapeworm	1
Gonorrheal conjunctivitis	1	Tonsilitis, acute	10
Gumma of brain	1	Tonsilitis, chronic	1
Heart, fatty degeneration of	1	Tuberculosis	10
Hepatitis	8	Typhoid	10
Hysteria	5	Tropical ulcers	3
Indigestion, acute	15	Varicocele	1
Influenza	2	Vertigo	1
Insanity	1	Vulvitis	1

The following constitutes a list of the officers and employees of the Philippine Civil Hospital, Manila, P. I.:

H. Eugene Stafford, attending physician and surgeon; Charles Fitzpatrick, assistant attending physician and surgeon; Robert W. Fort, house physician; Samuel D. Bradlee, superintendent; Charles W. Beyer, dispensing clerk; Julia M. Betts, chief nurse; Ingeborg Stokke, dietist.

In addition, there are the following employees:

Designation.	Number.	Designation.	Number.
Trained nurses	9	Laborers	5
Ward attendants	10	Boys	5
Ambulance driver	1	Driver	1
Native clerk	1	Servants	12
Cooks	4		

Very respectfully,

H. EUGENE STAFFORD,
Attending Physician and Surgeon for Civil Officers and Employees.

Appendix H.

REPORT OF THE ATTENDING PHYSICIAN AND SURGEON IN CHARGE OF THE CIVIL SANITARIUM AT BAGUIO, BENGUET, FOR THE YEAR ENDING AUGUST 31, 1902.

Civil Sanitarium,
Baguio, Benguet, September 1, 1902.

Hon. Dean C. Worcester,
Secretary of the Interior.

Sir: In compliance with your telegram of recent date, I have the honor to transmit herewith a brief report of the progress of the sanitarium from the time of its establishment to September 1, 1902.

Very respectfully,

J. B. Thomas,
Attending Physician and Surgeon.

The United States Philippine Commission early recognized the necessity for some mountain retreat or station in the islands themselves where the civil employees of the government might retire to recuperate from the debilitating effects of continuous service in the tropical heat of the lowlands, thus taking advantage of high altitude and making it in a way compensate for latitude. One of its first acts was to detail Commissioners Worcester and Wright to visit the mountains of Benguet, concerning the climate of which province some noteworthy reports had been issued by the Spanish Government, and as a result of this visit Baguio, a small Igorrote village in the pine belt nearly 5,000 feet above the China Sea, was chosen as the location of the future "hill station."

As a nucleus of the institution the improvements on a small piece of land occupied by Mr. Otto Scherer were bought by the insular government, and these included a substantial native house, with pine floors and siding and grass roof. This building contained a dining room, kitchen, and three bedrooms, with capacity for about eight beds; it was surrounded on two sides by a broad porch, and the ground floor was entirely open. This was the original sanitarium, and it was inaugurated as a branch of the Manila Civil Hospital on February 3, 1902, when Dr. H. E. Stafford and party arrived at Baguio with the first supplies. The personnel consisted of an acting superintendent, one nurse, and one attendant.

Within a few weeks siding was added to the lower part of the house and the ground floor curtained off as a dispensary and sleeping place for employees and builders. In May Governor Pack completed a small provincial hospital, with a capacity of ten or twelve beds, and by agreement with the secretary of the interior the male employees of the sanitarium now occupy a portion of that building, and the sanitarium reciprocates by furnishing subsistence and free medical attendance to the wards of the province.

About the middle of April a force of Chinese carpenters, under the direction of the bureau of architecture, began to cut and prepare timber for an enlarged sanitarium and system of six cottages, the latter designed for occupancy by families. This work of lumbering and building has progressed in the face of many difficulties, including strikes, cholera, bad transportation, extraordinary rains and scarcity of labor, and at the present date one-third of the new sanitarium is about ready to turn over to the furnishers. The old building forms the center of the new system, and will be divided into a dining room and sitting room, with a commodious fireplace, the latter being a grateful and almost indispensable feature of the place during the winter months and during the evenings throughout almost the entire year. The north extension is almost twice as long as the original building, and contains a large kitchen, rooms for stores, and four large bedrooms on the main floor fronted by a broad veranda about 50 feet long. The lower floor includes four more bedrooms, storerooms, a dispensary, emergency ward, and rooms for employees. For building material the white pine of Benguet has been used exclusively, the roofs being covered with rubberoid. The work is handsome and substantial, every board having been cut, sawed, dressed, planed, tongued and grooved, and put in place by hand. By October 1 it is hoped to begin work on the south extension of the sanitarium, which will consist of two wards, an upper and a lower, fronted by a veranda and capable of accommodating 36 patients in all. This extension should be completed by November 1, making the total capacity of the sanitarium about 60 beds.

Pending the establishment of the completed sanitarium, the Commission passed act 429 at the beginning of the present fiscal year, making temporary provision for the conduct of the sanitarium by appointing an attending physician and surgeon with the added functions of disbursing officer and superintendent of buildings, the surgeon to be directly responsible to the Secretary of the Interior and to make weekly reports to him. The force was reduced to 1 nurse, 1 attendant, 1 cook, and 2 native servants, thus providing for the care of a limited number of patients and of the employees of other bureaus working at the sanitarium.

From the opening of the sanitarium to the present date 43 patients have been received, a portion of whom might appropriately be called guests, as they were in good health and were members of the families of the real patients. No medical records were kept up to July 1, but it is safe to assert that four-fifths of the patients sought relief from general debility induced by a tropical climate, and it is a matter of common knowledge here that the great majority of the patients reacted promptly to the bracing atmosphere and improved rapidly. Medical records of all patients are now being kept, and their preparation and study will be a matter of particular attention in the future, but the data accumulated up to the present time are too meager to permit of any generalizations or deductions as to the classes of diseases that derive special benefit from the local climatic conditions.

Bills accruing to the sanitarium for attendance and subsistence of patients have aggregated $1,521.33 United States currency.

APPENDIX I.

REPORT OF THE COMMITTEE APPOINTED TO SELECT A SITE FOR A LEPER COLONY.

MANILA, P. I., *January 1, 1902.*

The UNITED STATES PHILIPPINE COMMISSION.

GENTLEMEN: On December 10 a committee consisting of the commissioner of public health, the sanitary engineer of the board of health for the Philippine Islands, and the secretary of the interior sailed on the U. S. S. *General Alava* to investigate the fitness of the island of Cagayan de Jolo for a leper colony. This island had been previously visited by a board of officers appointed by General MacArthur, and this board had reported unanimously in favor of its selection for this purpose, stating that the population numbered about 200 or 300 poverty-stricken natives, who could probably be removed without serious difficulty, and that there was little property on the island, so that any property rights possessed by its present inhabitants could be acquired by the Government at very small expense.

A short stop was made at Calapan, in Mindoro, to investigate political conditions there, and another short stop at the island of Cuyo, where an unsuccessful attempt was made to secure a competent interpreter, in order that the committee might be sure of being able to communicate with the inhabitants of Cagayan de Jolo.

Cagayan de Jolo was reached on the morning of December 14, shortly before noon. An attempt was made to anchor at the northwestern extremity of the island, near where the interpreter and United States representative was understood to live. It proved impossible to find an anchorage, however, and the steamer was obliged to stand on and off while we landed and attempted to get in communication with the interpreter. The men whom we met on shore were all armed, and, while apparently not unfriendly, either could not or would not understand either Spanish or Tagalog. After great difficulty we gathered information to the effect that Capitan Mariano, the man whom we were seeking, lived to the westward behind a projecting point, which was shown to us. Returning to the steamer, we followed the coast line to this point and made a second landing. Here we found the people more inclined to be communicative, and Mariano's house, distant some 5 miles, was pointed out to us. We again returned to the steamer, but as thick weather, with heavy squalls, came on, were obliged to give up the attempt to get in touch with the interpreter and run to the south coast of the island for protection.

During the night the wind changed and blew strongly from the southwest, and the vessel was obliged to get under way and run for the open sea. The following morning we returned to the vicinity of Mariano's house, but the sea was so rough as to make it impossible to lower a boat. We finally found a somewhat protected anchorage near the eastern extremity of the island. and landed three parties. One, under the sanitary engineer, set out for the top of the highest hill on the island, in order to take bearings of all important points, and to verify the existence of certain bodies of water shown on the chart; another, under the commissioner of public health, started directly toward the center of the island; and a third, under the secretary of the interior, followed a trail which showed conspicuously, crossing a range of hills to the eastward. The entire day was spent in exploring the island. It proving impracticable for any of the parties to reach Mariano's house, a runner was dispatched with a request for him to come overland and board our vessel.

The day's work conclusively showed that several small streams and one river indicated on the chart had no existence in fact, and that a lake which appeared on the chart near the center of the island did not exist, there being only a bog hole at the center of a somewhat extensive valley, into which surface water drained from all directions, but from which there was no outlet. This bog, we were informed, dries up completely during the dry season.

The day's work also showed that the number of the people on the island had been greatly underestimated by the board which had previously reported upon it.

At 8 o'clock that evening the interpreter, Mariano de Leon y Legaspi, came on board our vessel, and we had a long interview with him. This gentleman has resided in Cagayan de Jolo, first as a representative of the Spanish Government and subsequently as the United States representative, for eleven years, and is thoroughly familiar with the island. He informed us that the Moro population numbered not less than 3,000 souls; that there were two important datos, namely, Dato Dakulá and Haji Dato Hamil Tamya. There are also four other datos, sons or nephews of the two above mentioned, who have no following as yet, and exercise little or no political influence.

It was ascertained that there were upon the island some 40,000 cocoanut trees in bearing, and that extensive areas were also planted in bananas. A small amount of land was planted with rice, and there were some 500 head of cattle, the number being strictly limited by the lack of any adequate water supply.

The Moros obtain their drinking water from shallow wells 6 to 10 feet in depth, which at the time of our visit contained from 1 to 2 feet of water, showing a pearly color and evidently containing mineral substance in some quantity. We were informed that during the dry season nearly all of these surface wells failed, so that it was necessary for many of the inhabitants to go from 5 to 10 miles for drinking water, and that during the height of the wet season the water in these wells became very foul from surface drainage.

Detailed inquiries were made as to the water supply of the island, and the fact was developed that there is at one point a pool some 24 yards in diameter known as Bojekukúk, which is very deep and discharges by a subterranean passage believed by the natives to connect with a small circular lake filled with fresh water, situated within a few hundred yards of the south coast of the island and separated from it by a solid wall of rock. The surface of the water in this lake is approximately on a level with the sea, and the small pool above referred to is situated near the bottom of an extensive valley, so that even should the water from either of these sources prove suitable for drinking purposes and adequate in amount, an extensive pumping plant would be necessary in order to distribute it among the population of 8,000 to 10,000 souls, which is probably the low limit to be anticipated as the ultimate population of our leper colony.

Finally, it was definitely ascertained that Cagayan de Jolo had no port and that there was no good anchorage. The island is so small that heavy seas run around it and either break directly or back in upon every part of the coast line, which is throughout its entire extent fringed by a reef in some places wide and in others narrow, but everywhere coming so near the surface as to cause a dangerous surf during heavy weather.

It is believed that the climate of the island of Cagayan de Jolo is healthful and that its soil is fertile. But in view of the absence of any safe port or good anchorage, the lack of any adequate supply of fresh water which can be utilized without the incurring of a heavy expenditure, and the great difficulty and expense involved in acquiring the property rights of a population of 3,000 Moros and in removing them from the island, the committee decided unanimously and without hesitation that Cagayan de Jolo was not adapted to the needs of the contemplated leper colony.

On the following morning we accordingly sailed for Culion. A very severe storm was encountered and, after battling with it for a day and a half, we put into Puerto Princesa, Palawan, and remained there for twenty-four hours in order to allow the officers and crew of the *Alava* to secure much needed rest. We then continued our voyage to Culion, arriving there on the evening of December 17. We landed immediately, and the evening was spent in a conference with the lieutenant in command of the small garrison at present situated at the town of Culion, a small place of about 67 buildings, all but 7 of them being huts of bamboo and nipa palm. The estimated population of the town is 250 souls, of whom all but three families are poor day laborers.

The island of Culion had been visited by the army board above referred to, but they had confined their investigations to a tramp over the hills from the town of Culion to the barrio known as Baldat, and had reported that the island was suited to the needs of a small colony, believing that the lack of suitable and extensive agricultural lands would prove an insurmountable obstacle to the establishment of a large one.

This board had failed to reach the extensive and fertile valley known as the Cogonal Grande (the great grass field), which occupies the central part of the island and sends side valleys down to the northeastern and southwestern coasts.

The Secretary of the Interior, having visited this valley in the years 1891 and 1892, had personal knowledge of its existence and extent, and an overland march was arranged for the following day in order that it might be fully investigated.

The early morning hours of this day were spent in examining into the water supply of the town of Culion. There is a fine spring which flows 19,400 gallons per day at the height of the dry season. This water is said to be of excellent quality. It is distant from the town about a quarter of a mile, and could be readily piped along the beach.

In order to avoid a 3-mile tramp over the hills we went to Baldat by boat. From that point a walk of three hours and a half brought us to a beautiful side valley which extends to the westward, connecting with the Cogonal Grande, and to the eastward nearly to the coast. Ten years ago there were a number of houses in this valley, but at the present time there remains but one. The trail which we followed crosses a range of hills and at its highest point reaches an elevation of 850 feet. The descent from this point to the side valley above referred to is somewhat abrupt, and, while it would be practicable to build a carriage road along this route, it would be a somewhat expensive undertaking. The distance from Baldat to the side valley is approximately 6 miles. On the march from Baldat we crossed five fine streams of pure water, the fourth following along the side valley itself, and the fifth coming down the high hills immediately back of the single house above referred to.

After a short rest we pushed on to the Cogonal Grande, distant a mile and a half. The route which we followed could be made practicable for an army wagon by simply burning off the dry grass and bridging two narrow dry gullies. The land is practically level all the way.

The Cogonal Grande itself is a flat valley, which was probably at one time the bed of a fresh-water lake. It slopes very gently from all sides toward the center, where there is a considerable area of low, swampy ground, suitable for rice culture. In this low ground a stream originates which joins the large stream flowing along the side valley above referred to.

The committee were agreed that the side valley and the Cogonal Grande afforded an ideal site for the proposed colony, and furnished abundant and suitable lands for agriculture and stock raising. A tramp of twenty minutes to the southward along the second side valley—partly open and partly overgrown with low bamboo—brought us to another fine stream of pure water, and the sanitary engineer followed up its bed for a sufficient distance to ascertain that it could be piped over the low divide into the Cogonal Grande. We were informed by the natives whom we took with us that this stream flowed continuously throughout the year, although with a somewhat reduced volume at the height of the dry season.

We were also informed that there was an extensive and safe harbor on the southwest coast of the island but a short distance from the point where we then were, which could be reached without crossing any hills. This harbor was said to be landlocked, and to afford a safe refuge during typhoons, although this information was in direct contradiction of the China Sea sailing directions, which state that this coast of Culion is fringed at a distance of 5 to 7 miles by dangerous reefs. We decided to investigate the practicability of reaching this alleged harbor, and, should the facts prove to be as stated, to request the captain of the *General Alava* to attempt to enter it from the sea. We accordingly made an early start on the following day. We reached tide water about 12.30, after a tramp of some 5 or 6 miles, during which we had descended about 150 feet with practically no lost distance, the ground along the entire route, with the exception of the last quarter of a mile, being so level that an army wagon could be driven for the entire distance after the low bamboo had been cleared and the low grass burned. For the last quarter of a mile the trail runs along a side hill, and for a short distance through a nipa swamp.

We were assured that ships' boats could come up to the point which we had reached. It being evident that a road from this point to the Cogonal Grande would be shorter, and could be constructed at far less expense than could one from the town of Culion, we decided to request Captain Halsey, of the *General Alava*, to fully investigate the practicability of entering the alleged port. We accordingly marched that afternoon entirely across the island, the secretary of the interior remaining at Baldat to gather further information as to the population and resources of the island, and the remainder of the party going on board the steamer, which sailed the following morning for the southwest coast. The investigations carried on by Captain Halsey and the other officers of the *General Alava* resulted most satisfactorily. They discovered a completely landlocked inlet, which they entered for the distance of 4 miles, finding nowhere less than 17 fathoms of water. It was ascertained that they might have entered a mile and a half farther. Captain Halsey characterized the harbor as "grand," and Executive Officer Chase stated it was without exception the finest harbor he had seen in the Philippine Islands. Captain Halsey added that he would without hesitation take into it the largest battle ship afloat. It was found that two fresh water streams flowed into it, and a boat party was sent out to explore each. One of these parties reached without difficulty the point on the bank to which we had come on the previous day. The other, under the commissioner of public health, found a still more favorable place for landing by following up a stream which had nowhere less than 6 feet of water until they reached an open grass-grown valley with high ground, affording abundant room for landing, town site, etc. There can be little doubt that this valley connects directly with the one along which we had come on the previous day, although there was not sufficient time to verify this fact.

On the following day the vessel returned to Culion, and the next morning a meeting of the property owners of the island was called in the tribunal of the town. They were interrogated as to the extent of the population, the number of buildings, and area of cultivated land outside of the town, and the number of cattle on the island, were informed as to the object of our trip, and were further informed that should it be necessary to take their property adequate compensation would be given them.

It appears that the population of Culion numbers 800 to 1,000 souls, of whom more than one-half are Tagbanuas, a harmless wild people who have no fixed abode and no property. The remainder of the population, with the exception of the property owners hereinafter listed, is composed of poor laborers, who were formerly contented with a daily wage of five cents Mexican, and are now satisfied with a peseta.

The following is a list of the property owners of importance, with a statement of the property which they claim to own. In no case does there exist any written title to land claimed, and in each instance the land is claimed only by right of actual possession:

Juan Palancea.—Nationality, Chinese. Claims 200 hectares of land, of which only about 50 hectares are at present under cultivation. Has worked this land for 15 years. Has 10 hectares in sugar cane and 10 in rice. Also 200 cocoanut trees, 100 cacao bushes, and about 20 orange trees. One house of light material, and is constructing a house of solid material. One cane mill said to be worth 20 pesos.

Doroteo Rodriquez.—Claims 15 to 20 hectares of land, about 12 of which are under cultivation in rice. Has about 50 cocoanut trees, 100 cacao bushes and 50 head of cattle. Also two houses of light material, estimated by him to be together worth 100 pesos.

Estaphania Rodriquez.—Claims 56 hectares of land. Has about 300 cocoanut trees, 30 cacoa bushes, oranges, mangoes, bonga, and nanca, 40 trees of the latter. Has house property which he estimates to be worth 90 pesos, and about 490 head of cattle, including 90 carabaos.

Evanista Manlobi.—Claims a very small tract of land on Culion; more on a small island near by. The latter planted with cocoanut trees, of which he has 540. Also, some 500 small cacao bushes and a few other fruit trees. Has one small house for the caretaker on her premises.

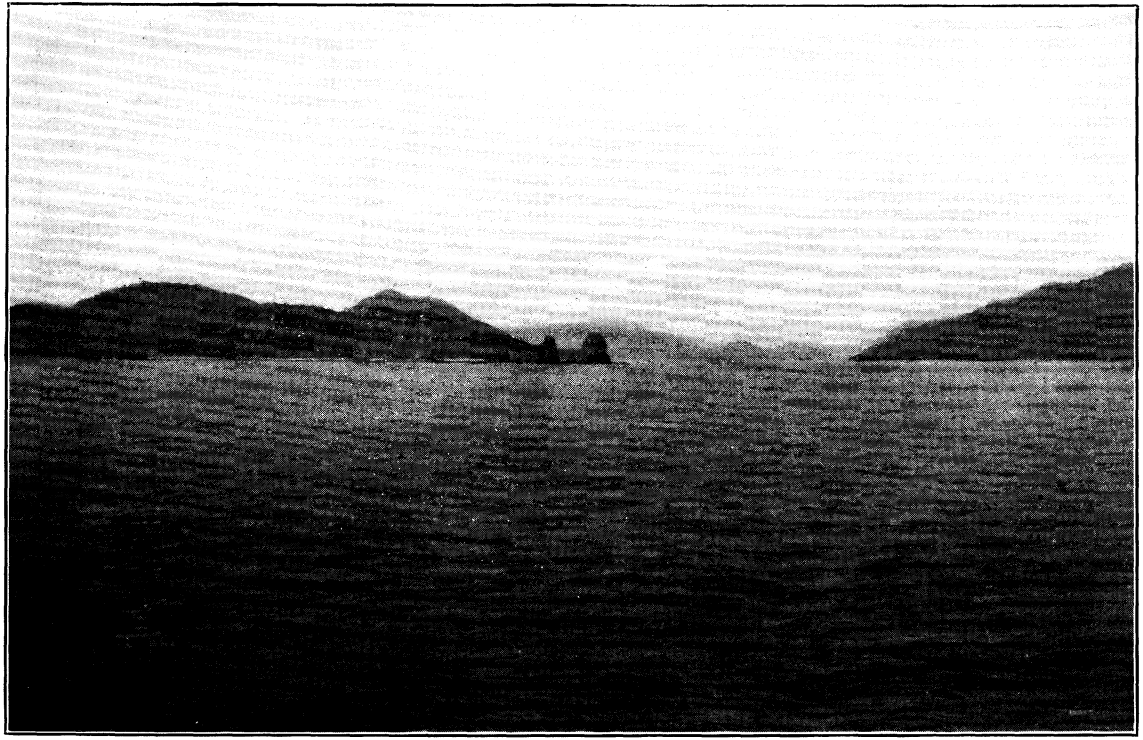
Ignacia Pavero.—Claims 7 hectares of land, 20 cocoanut trees, and 4 carabaos.

Cotilino Abreng.—Claims 3 hectares of land. Has 70 cocoanut trees, and 5 carabaos. Also, two houses estimated to be worth 25 pesos each.

The persons here listed were stated to be the large property holders of the island. It was stated that some 20 people claimed to own land, but all of the others claimed only insignificant amounts. It will be seen, therefore, that outside of the little thickly peopled area covered by the town of Culion, there are claimed but approximately 290 hectares of land, and this amount is claimed only by virtue of actual possession. On this land there are about 8 small houses. The other property claimed to be owned consists of 640 cocoanut trees, 730 cacao bushes, a few oranges, nanca and other fruit trees, and 549 head of cattle.

The town of Culion is built on a rocky promontory which juts into the sea. The buildings, of which there are some 67, are placed close together. All but seven of these are huts of bamboo and nipa, estimated to be worth approximately 20 pesos each. The remaining houses are of strong materials, and the following is a list of the owners, with values as estimated by Lieutenant Young, in command of the garrison at that place:

	Value (Mexican).
Evanista Manlabi, 1 house	$600
Juan Planca, 1 house	1,500
Señora Sandoval, 2 houses (1 of nipa)	450
Antonio Sandoval, 1 house	1,200
Doroteo Rodriquez, 1 house	350



SOUTH ENTRANCE TO HALSEY HARBOR, CULION ISLAND.

There remain to complete the list an old convent of little value, at present used as a barrack, and a strong stone fort within which is situated the church.

It is confidently believed that nowhere else in the archipelago can there be found an island so healthful, extensive, and fertile, which has so small a population. It is doubtful whether there would be any necessity for disturbing the little town of Culion, as it will be some miles distant from the proposed site for a leper colony, and likelihood of intercommunication between its people and the lepers would be small.

It is recommended:

(*a*) That all the land in the island of Culion proper, which does not lie within a radius of 3 miles of the church in the town of Culion, be set apart for a leper colony, and that persons who have a possessory title to cultivated land within the area so set apart be given a just compensation for the resulting loss to themselves.

(*b*) That no nonleprous person be allowed to live within the area set apart for the leper colony without the written permission of the superintendent of the colony, such permission to be granted only to persons whose presence is useful or necessary in the conduct of the affairs of the colony.

(*c*) That an accurate census of the population of the island of Culion proper be taken immediately, and that no person not resident there at the present time be allowed to take up his abode there without the written permission of the superintendent of the leper colony.

(*d*) That no person be allowed to continue to reside in the town of Culion after June 1, 1902, except those employed in connection with the leper colony and the members of their families.

(*e*) That just compensation be allowed to persons thus obliged to leave the town of Culion for the house property, if any, which they own there, and that said house property shall become the property of the colony, unless the owners are able and prefer to dispose of it to other residents of the town, in which case no compensation shall be allowed them.

(*f*) That the visiting of any part of the island of Culion, outside of a circle with a radius of 3 miles, drawn from the spire of the church of Culion as a center, by any nonleprous person be prohibited, unless such person has the written permission of the secretary of the interior or the superintendent of the leper colony.

(*g*) That a road be constructed connecting Halsey Bay with the Cogonal Grande and its principal side valley.

(*h*) That a house for the superintendent of the colony, one for doctors and hospital employees, a hospital for lepers, and a suitable number of houses to accommodate ten patients each, be constructed in accordance with plans prepared under the direction of the commissioner of public health and approved by the Commission, and that said buildings be furnished with adequate water supply.

(*i*) That horses, carabaos, cows, and bulls be purchased for the colony, and that it be made obligatory on all owners of other cattle to remove them from the island on or before the 1st day of June, 1902, in order to prevent the running together of herds belonging to the colony and those belonging to private individuals.

(*j*) That land be set apart for every leper able and willing to cultivate the soil, and that he be furnished with the necessary seed and agricultural implements.

(*k*) That a storehouse be constructed at a suitable point on Halsey Bay, at or near the beginning of the road leading to the Cogonal Grande.

(*l*) That the houses constructed for the accommodation of male and female lepers be in two widely separated areas, and that communication between the two sexes be absolutely prohibited.

(*m*) That the father, mother, wife, brother, sister, or children of a leper, or other near relative, if there be no father, mother, wife, brother, sister, or children, be allowed to go to Culion and establish himself or herself in a nonleprous town on a site to be selected by the superintendent of the colony, persons who desire to build being afforded opportunity to do so, and persons desiring to cultivate the soil having assigned to them for that purpose such tracts of land as the superintendent of the colony may deem advisable. All the relatives of each leper to leave the territory set aside for the colony within one month after the death of such leper, the land cultivated by them to remain the property of the colony, and any buildings erected by them to become the property of the colony on their departure.

(*n*) That the board of health for the Philippine Islands be authorized and directed to prepare further rules for the government of the colony, subject to the approval of the secretary of the interior.

(*o*) That the inmates of the lazarettos at Manila, Cebu, and Palestina be removed to the leper colony at the earliest practicable time, so that the buildings at present occupied by them may be put in a sanitary condition and used for other governmental purposes.

(*p*) That a law be enacted providing for the control and suppression of leprosy in the Philippine Islands, and for the setting aside of the island of Culion for a leper colony, said law to embody such of the above suggestions and such additional provisions as the board of health for the Philippine Islands may recommend and the Philippine Commission approve.

Very respectfully,

DEAN C. WORCESTER,
Secretary of the Interior (*for the Committee*).

APPENDIX J.

REPORT OF THE CHIEF OF THE FORESTRY BUREAU FOR THE PERIOD FROM JULY 1, 1901, TO SEPTEMBER 1, 1902.

TERMS USED IN THIS REPORT.

Almáciga	mastic.
Balao	vegetable oil.
Bejuco	rattan.
Breas	pitch.
Carbon	charcoal.
Cascalote	tan bark.
Cautchuco	rubber.
Goma elastica	
Copal	a transparent gum soluble in ether and essential oils.
Guta-percha	gutta-percha.
Resina	resin.
Sibucao	dyewood.
Tintoreas	

LINEAR MEASURES.

Pie (Spanish foot) equals 0.91 foot English.
Punto (one-tenth part of Spanish foot) equals 1.09 inches English.
Meter equals 39.37 inches English.
Vara equals 33 inches English.

SURFACE MEASURES.

Hectarea equals 2.471 acres or 10,000 square meters.
Area equals 119.6 square yards.
Centiarea equals 1,550 square inches.

CUBIC MEASURE.

Pie cubico (Spanish cubic foot) equals 0.764 cubic foot English.
Cubic meter (46.33 Spanish cubic feet) equals 35.4 cubic feet English.

LIQUID MEASURE.

Ganta equals 3 liters or about 3.17 quarts English.

DRY MEASURE.

Ganta equals 3 liters or about 1 pound English of charcoal.

Local currency values at present rate of exchange, 2.35.
Peso equals 42½ cents United States.
Real equals 5 cents United States.
Cuarto equals 0.26 cent United States.
All moneys other than salaries of foresty officials mentioned in this report are in local currency.

MANILA, P. I., *September 8, 1902.*

The Honorable SECRETARY OF THE INTERIOR,
Manila, P. I.

SIR: I have the honor to submit herewith the report of the bureau of forestry for the period beginning July 1, 1901, and ending August 31, 1902.

During my absence on leave in the United States, from May 18 until December 1, 1901, the office was in charge of Capt. A. E. McCabe, at that time an inspector in the bureau. While in the United States I visited, by authority of the Philippine Commission, the forestry schools at Yale, Cornell, and Biltmore, and conferred with the professors and students, with the object of securing graduates of these schools for the Philippine forestry service. The Yale and Cornell schools have each about forty students, each student having completed his college course before entering the school of forestry. The forestry school at Biltmore has but a few students, but their course of instruction is of a very practical character. The directors of these schools are able men, and each is assisted by a competent staff. From these schools must be drawn material for the technical work in the Philippines. Outside of these schools there are very few foresters in the United States; not enough to do the work contemplated by the Bureau of Forestry in Washington. However, I advertised the fact that foresters were wanted for the Philippine service at salaries of $2,418 per year, with all field expenses paid.

Arrangements were made with the Civil Service Commission in Washington to hold an examination in the United States on September 9 for candidates for our forestry service. This examination was equivalent to that held for the position known as "field assistant" in the Bureau of Forestry in the Agricultural Department at Washington. Five men, R. C. Bryant, Edward Hagger, Edward H. Hareford, William Klemme, and W. W. Clark, passed, and several candidates failed to pass this examination. Edward M. Griffith was transferred from assistant forester in the Bureau of Forestry, Washington, to the forestry bureau in Manila. Mr. Neely was transferred from a furloughed list in the Agricultural Department, Washington. Mr. Griffith entered as forester and Mr. Neely as manager of the timber testing laboratory. These men, with the exception of Mr. Griffith, and Mr. Clark, arrived in Manila, December 2; the latter two arrived several months later.

While in the United States, authority was received from Manila to purchase an equipment for a timber testing laboratory, books and instruments for the bureau. Mr. Neely visited Philadelphia and made arrangements for the purchase and shipment of the laboratory equipment. Mr. Neely had been employed in the Agricultural Department as an assistant while that Bureau conducted an elaborate series of timber testing experiments. He was highly recommended by that Department for this position, and judging from the manner in which he has installed his equipment and inaugurated a systematic series of tests, it seems probable that in the near future, contractors, builders, and others interested in the strength, durability, and suitability of native woods will have some intelligible data to work upon in their selection of building material from the three hundred or more varieties of wood entering the Manila market.

In connection with the laboratory tests, a workshop has been started, in which every variety of native wood which can be secured will be worked up in one or more ways to show its most valuable use in the market. This will tend to solve the most difficult problem confronting the forester in the Philippines, viz, to induce the logger to take a great variety of tree species which are to-day considered of no value, simply from the fact that these species are not well known in the market.

A competent cabinetmaker from the United States is on his way to take charge of this shop, and it is intended to place under his instruction a number of the best Filipino wood workers and carvers, who will readily respond to such teaching. The famous wood carvings in the Jesuit Church in Manila and the beautiful work done in Paete illustrate the Filipino's skill and artistic sense. It is intended to make this workshop self-supporting and to encourage as much as possible this feature of the work of the bureau.

Several foresters employed in the Indian service have made application to enter this work in the Philippines, but the authority to employ foreigners in our civil service has not been granted. This office has made an unsuccessful effort to secure the services, for a limited period, of the Hon. Bart. Ribbentrop, who had accomplished such excellent results in the forestry department in India. The problems confronting the forestry officials in India forty years ago, when the service was in its infancy, were very similar to those now to be solved in the Philippines, viz, a great variety of unknown tree species, a large population per square mile, with easements of various kinds on public timber land, and a lack of accurate surveys and knowledge of boundaries. These problems were met and solved successfully by Mr. Ribbentrop, and it would save us much time, money, and annoyance to take advantage of his experience.

The restrictions imposed by what is known as the Spooner amendment to the Army appropriation bill, passed in March, 1901, continued in force until July 1, 1902, and were interpreted in accordance with the opinion of this amendment as given by the War Department. The opinion stated:

"This enactment permits the President of the United States to grant such temporary privileges as are 'clearly necessary for the immediate government of the islands and indispensable for the interest of the people.'"

All timber cut on public land is cut under license, and the amount cut has never, since the American occupation, met the needs of the people. The result has been that millions of feet of American pine and redwood and of timber from Borneo and Australia have been shipped in to meet a part of the demand. (See Appendix.)

The following dispatch stopped for a time the further issuance of licenses:

"WASHINGTON, D. C., *July 24, 1901—8.40 p. m.*

"TAFT, *Manila*:

"Secretary of War directs send by first available transport full and complete copies existing licenses granted by forestry bureau. Do not grant more licenses till you receive instructions. Report to date, and monthly thereafter, amount forest products taken from public or private lands, also amount imported and exported after May 1. Send two sample sets forms used in forestry bureau.

"EDWARDS."

The following dispatch was received in response to a request by Governor Taft to be permitted to grant gratuitous licenses:

"WASHINGTON, D. C., *September 21, 1901.*

"TAFT, *Manila:*

"With reference to your telegram of 17th September, Secretary of War authorizes further issue firewood and gratuitous licenses, especial care being taken in each case not to issue more than actual necessity demands. With reference to your telegram of 4th September, Secretary of War desires to know if practicable to insert in timber licenses limitation on amount to be cut thereunder. What do you advise as maximum?

"EDWARDS."

To which dispatch the following reply was sent:

"MANILA, *September 25, 1901.*

"SECRETARY OF WAR, *Washington:*

Greatest amount of timber cut one year by one person or company, 100,000 cubic feet. Commission thinks this small. Manila demand for lumber great. If limitation imposed, should not think 500,000 cubic feet for a year excessive.

"TAFT."

The authority to issue timber licenses was received as per the following dispatch:

"WASHINGTON, *October 22, 1901.*

"TAFT, *Manila:*

"With reference to your telegram of the 17th ultimo, Secretary of War again permits issuance timber licenses; in addition to previous restrictions grant but one timber license to each one bona fide individual applicant—not exceeding 30 in one province; cut under any individual license not to exceed 10,000 cubic feet; incorporated companies allowed 100,000 cubic feet—only 3 such licenses in each province. Licenses to expire not later than June 30, 1902.

"EDWARDS."

These instructions have been followed strictly.

On July 13, 1901, the following act of the Philippine Commission was passed:

[Act No. 165.]

"SECTION 1. Any person who desires to ship forest products of whatever sort to a foreign port shall produce to the collector of customs at the port of shipment a receipt from a forestry official showing that the forestry taxes on these products have been paid, unless such products are taken from private land the title to which has been properly registered in the office of the forestry bureau, Manila, in which case the shipper shall produce a certificate from a forestry official to this effect.

"SEC. 2. No collector of customs shall clear a vessel having on board forest products of any sort from any port of the Philippine Islands for a foreign port until the shipper of such products has complied with the provisions of section 1 of this act.

"SEC. 3. Every collector of internal revenue and every provincial treasurer in the Philippine Islands shall make to the chief of the forestry bureau an itemized monthly report of all moneys received by him for taxes on forest products, giving for each payment the date when made, the name of the payer, the number of the forestry official's order under which the payment is made, the nature of the product on which the payment is made, the name of the province in which it was taken, and the amount of the payment.

"SEC. 4. The public good requiring the speedy enactment of this bill, the passage of same is hereby expedited in accordance with section 2 of 'An act prescribing the order of procedure by the Commission in the enactment of laws,' passed September 26, 1900.

"SEC. 5. This act shall take effect on its passage."

Enacted July 13, 1901.

This act was especially intended to reach the ports of Zamboanga, Jolo, and Siassi, where, prior to this, quantities of rubber, gutta-percha, and other forest products had been frequently shipped to Borneo, Singapore, and other ports without payment of the government charge.

This act also provided that provincial treasurers and collectors of internal revenue make monthly itemized reports to the bureau of forestry of all revenues collected by them on forest products.

On July 16, 1901, act No. 171 was passed, creating the positions of chief and assistant chief of the forestry bureau, and fixing the salaries of the same.

On August 1, 1901, forestry bureau stations were established at Zamboanga and Cotabato, in Mindanao, and at Jolo, and the forestry regulations enforced in that region. A Moro dato, Rajah Mudah Mandi, was appointed assistant forester and placed in charge of the station at Zamboanga.

On August 1, 1901, the island of Negros was organized under the forestry bureau, and stations established at Bacolod and Damaguete. Prior to this, the island of Negros had its separate forestry laws, and was not under the jurisdiction of this bureau. All forest privileges granted by this separate establishment have expired, and were renewed by this office as deemed advisable.

On September 6, 1901, act No. 222 was passed, creating the department of the interior and placing the forestry bureau in that department.

LOCATION.

The forestry bureau has its main offices in the intendencia, or treasury building, where are found the chief and assistant chief of the bureau, the division of forest management and inspectors.

Here are kept the correspondence and records, and are dispatched all manifests of forest products which arrive in Manila.

The bureau has rented a building and some adjacent ground on the site of the old Arroceros market, which is used as a timber-testing laboratory and workshop.

The botanical division is located in the building occupied by the bureau of agriculture at No. 155 calle Nozaleda. Desk room is set aside in the custom-house building for the inspectors and rangers in charge of all forest products arriving in the harbor or Pasig River.

DIVISIONS.

The work of this bureau is administered by various divisions, as follows:

Division of inspection, Albert E. McCabe, assistant chief; division of forest management, E. M. Griffith, forester; timber-testing laboratory and workshop, Samuel T. Neely, manager; division of botany, Elmer D. Merrill, botanist.

The division of inspection, under the assistant chief, Capt. A. E. McCabe, has charge of the work of the various forestry stations in the islands, and by correspondence and visits of inspectors regulates the work of the forestry officials, whose chief duties are to classify, appraise, and order payment on all forest products taken from public lands. The forestry officials in charge of stations forward all correspondence relating to forestry matters from their districts to the main office.

The work of each station is carefully noted between inspections and a record kept of each official's efficiency. The frequent correspondence with each station and the routine reports from the latter keep the main office constantly advised as to how the service is being managed at each station.

Each station furnishes the main office with the following reports:

Diary of operations for the month.

Copies of manifests of all forest products classified, appraised, and whether or not paid for.

Report of all orders of payment issued and collections as evidenced by receipts from the provincial treasurers.

This latter report is compared with the monthly report of each provincial treasurer showing collections on forest products.

No forestry official is permitted to receive any money in payment of government valuation on forest products or for fines imposed. He merely issues an order of payment on the provincial treasurer and payment is made at the office of the latter, or to one of his deputies.

This division has also had charge of the inspection of private woodlands registered in this office. This class of work will, in the near future, be turned over to the division of forest management.

The division of forest management, under Mr. E. M. Griffith, a forester of ability and varied experience, has had field parties in the following places: Province of Bataan, island of Mindoro, province of Camarines, province of Tayabas.

The Timber-testing Laboratory and Workshop

Has been installed in one of the old buildings of the former market on Calle Arroceros, which has been repaired and fitted for that purpose. The building is an ideal one for a mechanical laboratory, being lighted by twenty-odd windows and doors and well ventilated. It is very conveniently situated on the Pasig River, whence, by means of a short canal, logs can be brought on cascoes to the doors of the laboratory

The building has a clear floor space of 90 feet by 30 feet, the floors being of concrete.

The southern end of the building is used as the office of the manager and for the exhibition of wood specimens. Along the wall at this end are a series of shelves, which contain small polished samples of several hundred Philippine woods, arranged according to their groups. Here, too, are large polished slabs of the best-known and most useful woods of the archipelago. It is intended to add to this collection until a sample of every kind of wood in the Philippines will be on exhibition.

The other end of the building is occupied by the mechanical laboratory, the equipment of which consists essentially of a machine for testing the strength of timber, and the wood-working machinery needed for preparing the specimens to be tested. The testing machine is one of the Tinius Olsen testing machines, of 200,000 pounds' capacity, on which tests for tension, compression, shearing, and cross bending can be made, the lower platform having been especially designed for the last-named test.

For shaping the specimens there is a saw table carrying a 20-inch circular saw, and a small hand planer. These machines are driven by a 10-horsepower upright engine, placed in the extreme northern end of the laboratory. Near the engine there is also a small dry kiln, heated by steam from the engine boiler. It is built of brick and concrete. It is 12 feet long, 6 feet wide, and 4 feet high, inside dimensions. The steam is carried directly at boiler pressure through two coils of 1-inch pipe, having 150 square feet of heating surface.

Besides the equipment for making strength tests, the laboratory has a pressure saturating machine, which has recently been patented in the United States and not yet put upon the market. The pressure saturating machine is one which injects any kind of preservative fluid into a piece of timber under great pressure. It thoroughly saturates the piece by filling all its pores with the fluid instead of affecting only the surface. Timber which is subject to attacks of the anay will be saturated with different preservatives and the preservative effect tested.

Connected with the laboratory on the east side is a shed 50 by 60 feet, which is used for storing timber to be tested later on. There are now on hand 100 varieties of wood from the Camarines, which were collected by one of the foresters of this bureau.

The procedure in making tests will be in the same lines as those which the United States Forestry Bureau followed in its study of timber physics.

Six-foot beams, about 4 by 6 inches in section, will be tested for cross bending and elasticity, after being seasoned in the dry kiln. The tested beam will then be sawed into blocks and tested for compression and shear. The amount of moisture will be determined in the case of each block and the specific gravity of the beam. From samples of each log there will be made a large number of compression tests on the green wood (above 33 per cent moisture), as this test is the most satisfactory of all.

Tension tests will be made only on special occasions, as it has been shown that timber never fails in direct tension, and the tests are not representative of any practical uses of the material.

The question of durability and resistance to the attacks of the white ant and other destroying insects is of great practical importance, but the tests for determining these qualities are difficult, and at best of a negative quality. The only practicable method is to place pieces of the wood to be tested where the white ant and other insects have free access to them and wait for results. Several attempts have been made to cultivate colonies of white ants and surround them with various kinds of wood, but so far, owing to unfavorable conditions, the ants have not thrived. Experiments which will give any useful results in this direction must necessarily cover several years. It is possible to say that the white ants did not attack a certain piece of wood under certain conditions, but to be able to affirm that they would not attack a certain kind of wood under any conditions will necessitate experiments of various kinds covering a long period of time. This should be taken into consideration by persons who wish to have the effect of a particular preservative or paint tested.

The present force of the laboratory consists of the manager, an engineman, and two carpenters. This force will need to be greatly increased to do all of the work which is mapped out. The estimate for funds for the coming quarter provides for six skilled laborers and additional equipment in this division. If approved, the work contemplated will be pushed ahead rapidly.

Personnel.

	Salary, U. S. currency.		Salary, U. S. currency.
Authorized July 1, 1901.		*Authorized Aug. 31, 1902*—continued.	
4 foresters	$2,400.00	1 botanist	$1,200.00
1 inspector	1,800.00	1 manager workshop	1,200.00
1 botanist	1,200.00	6 assistant inspectors	1,200.00
10 assistant foresters	600.00	6 assistant inspectors	900.00
30 rangers	300.00	10 assistant foresters	600.00
1 chief clerk	1,200.00	25 rangers	420.00
1 translator	1,200.00	40 rangers	300.00
1 law clerk	900.00	1 chief clerk	1,800.00
1 record clerk	900.00	1 law clerk	1,400.00
1 woodworker	[a].75	1 record clerk	1,200.00
Special agent (Dr. Sherman)	[b]1,800.00	1 translator	1,200.00
		1 accountant	1,200.00
Authorized Aug. 31, 1902.		2 stenographers	1,200.00
		4 clerks	900.00
Chief of bureau	....	2 clerks	600.00
Assistant chief	3,000.00	6 clerks	300.00
Manager timber testing laboratory	2,400.00	2 carpenters	240.00
6 foresters	2,400.00	1 woodworker	[a].75
4 inspectors	1,800.00	2 messengers	150.00
1 collector	1,400.00		

[a] Per day. [b] Temporary.

NOTE.—The botanist in bureau of agriculture ($2,000) is also assigned as botanist of forestry bureau, in addition to the botanist at $1,200.

Since July 1, 1901, the following losses to our force have occurred:

By resignation: 1 forester, 9 rangers, 3 clerks, 2 messengers.

By transfer: 1 inspector, 1 clerk, 1 ranger.

By death: 1 assistant forester, 2 rangers.

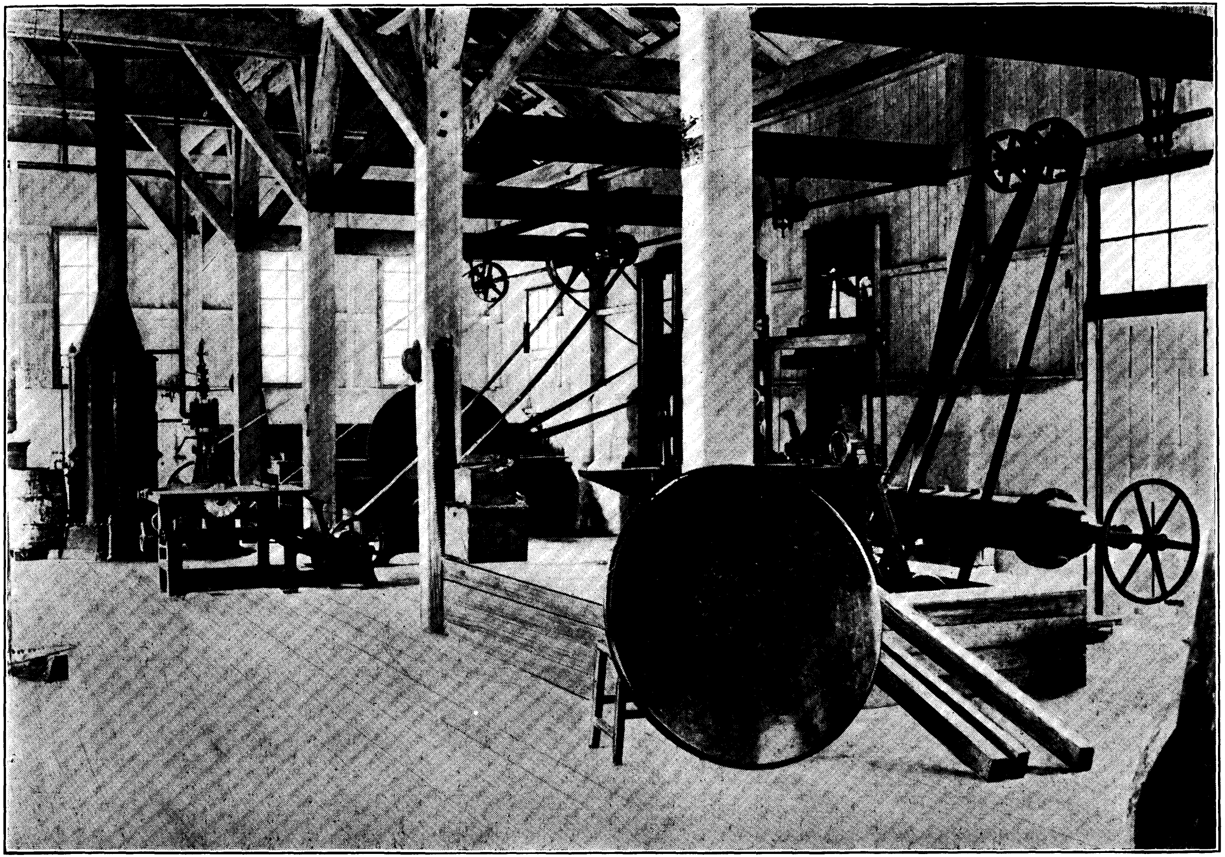
Discharged for cause: 1 collector, 1 assistant forester, 17 rangers, 2 carpenters, 1 messenger.

The work of this bureau has grown steadily and will undoubtedly continue to grow for many years. The best material for our technical force, as stated above, must be secured from the forestry schools in the United States. One or two seasons' field experience in the United States would be of great value to such graduates contemplating work in the Philippines. Such men will be employed usually in technical work, viz, making working plans in districts where logging companies contemplate operations.

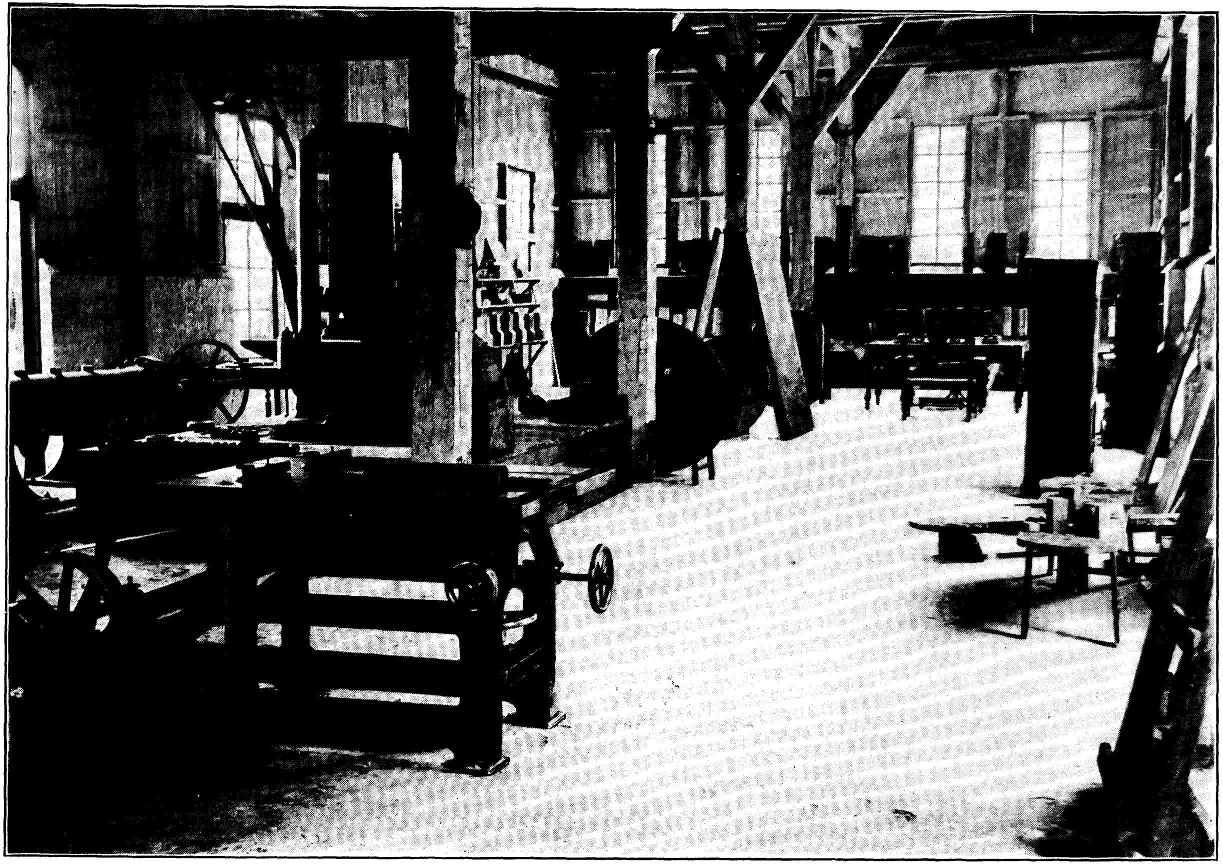
The administrative work of this bureau is done by 4 assistant inspectors, 10 assistant foresters, and 65 rangers.

All of the stations (42) beyond Manila are filled by Filipinos.

All officials of this bureau are in the classified civil service. Those who were employed in the bureau at the time of the inauguration of the civil-service law were taken into the civil service without examination, but are now required to pass an examination before being considered eligible for promotion. All the Americans in the service but 2 are now eligible for promotion, and all but 21 Filipinos. Six Filipinos took the examination and failed. Fifteen Filipinos have not taken any examination. All are urged to study the English language, and some knowledge of this language will be required in all future promotions.



INTERIOR FORESTRY BUREAU TIMBER-TESTING LABORATORY, MANILA.



INTERIOR FORESTRY BUREAU TIMBER-TESTING LABORATORY, MANILA.

The field parties are usually composed of 1 forester, 1 inspector, 1 clerk, 1 botanist or collector, and about 5 to 10 natives as cooks, carriers, tree namers, calipermen, guides, and laborers. The maximum expense for this extra native force is $65 gold per month for each field party.

The inspector destined for technical work will serve for a few months under a chief of party, and he will then, if practicable, be given a party and promoted to the grade of forester if results obtained by his party are satisfactory.

This bureau finds great difficulty in securing desirable inspectors. The graduates of the Cornell, Yale, and Biltmore schools are few in number, and attractive work offered them at home gives us but very few for the Philippines.

An examination for 6 forest inspectors for technical work in these islands was held in the United States June 10, but the result of the examination is not yet known.

We need at once at least 12 young men with college training as a basis and some training in forestry, such as is given in Minnesota and at Berea, Ky. These men are needed for the administrative work of the bureau. Their training in these islands would begin with about one month's work in Manila, followed by several months with field parties in that part of the archipelago where they would eventually be stationed as inspectors in charge of a group of stations covering a territory comprising half a dozen or more provinces. These men would begin their service with a salary of $1,200 per year and allowances for all actual and necessary traveling expenses.

The botanist, Mr. Elmer D. Merrill, who is also botanist for the bureau of agriculture, is assisted by Mr. Regino Garcia, a botanist and artist, with more than thirty-five years' practical experience in every region of the Philippines. Simeon Garcia, a son of Regino, and one other native also assist in that division.

A collector of forest botany has been authorized, and a competitive examination for this position has been held in the United States, the result of which is not yet known to this bureau. The collector will be given several men to assist him in his work, and as there will be four to eight parties in the field in different parts of these islands the work of collecting should progress rapidly.

The division of botany will be assisted in its field and office work by other employees of the bureau as required.

A request has been made on the Civil Service Commission in Washington to select 6 men as scientific aids.

The positions of "scientific aids" have been created in this bureau with the idea of giving instructors in botany in the United States who wish some experience in tropical conditions, recent graduates who may wish to collect data and material for thesis work for advanced degrees, forestry students, etc., an opportunity to become familiar with the botanical and forestry features of these islands, and at the same time aid in solving some of the many problems that confront us. To the botanist this field is especially attractive, for the flora of many sections is practically unknown, in spite of the great amount of work done by Blanco, Vidal, and others, and the large collections by Cuming, Loher, etc.

The salary of the "scientific aids," $25 gold per month, although indeed very limited, is deemed enough for the purpose, as those who are appointed receive all their traveling expenses to Manila, and as a large portion of their term of service here will be spent in the field, with all expenses paid, it is believed that, under existing conditions, the salary will be ample to pay all other ordinary expenses.

Field outfit, botanical presses, species sheets, driers, etc., and all other material necessary for making thorough botanical collections, will be furnished by this office, but one set of all collections made is to be deposited in the herbarium of this bureau and one set is to be deposited in the United States National Herbarium (the remaining sets to be distributed according to the discretion of the collector), with the recommendation that, if possible, sets be sent to the Kew Gardens, in England, and to the leading botanical institutions in the United States, the Gray Herbarium, New York Botanical Gardens, St. Louis Botanical Gardens, and Cornell and Yale schools.

Those who are appointed to these positions in this bureau will be assigned to one of the several field parties with directions to make thorough botanical collections, with special reference to the subjects which they have selected or which have been assigned to them.

According to the line of work, appointees may be transferred from one party to another in various parts of the islands as their work progresses.

At the present time there are field parties in the province of Tayabas and the island of Mindoro; work is contemplated in the near future in the provinces of Zamboanga, Bataan, Bulacan, and Negros. These field parties afford an excellent opportunity for making thorough botanical collections, as all the details, equipment, transportation, food, labor, etc., are settled by the forester in charge of the party, and the working botanist will have his entire time in which to make collections and take notes. To anyone familiar with Philippine conditions it is evident that this matter of having all details arranged is of the greatest advantage.

Selections of "scientific aids" will be made by the Civil Service Commission in Washington, to whom all applications should be addressed.

At present the herbaria of the bureaus of agriculture and forestry are united, and although now rather small, material is fast accumulating, and very soon we shall have a good working collection. It was especially unfortunate that the very valuable Spanish collections, classified by Vidal, with the collaboration of Mr. Rolfe, of the Kew Gardens, and containing much valuable material, the collections of Vidal and other Spanish botanists, and a partial set of Cuming's Philippine material, were entirely destroyed by fire in the autumn of 1897, together with a very valuable reference library. The botanical garden in Manila is very poorly situated and is a botanical garden in name only. At present it serves as a city park, and probably will for all time.

LIBRARY.

Our reference books are at present comparatively few, but the list below will give some idea of those available, to which should be added a practically complete library on the Gramineae, the personal property of F. Lamson-Scribner. Additional essential books will soon be ordered, and while it will be some time before we can hope to possess a reference library by any means complete, yet this department will be built up with our collections.

Bentley & Trimen, Medicinal Plants, 4 vols.
Bentham, Flora Hongkongensis.
Bentham & Hooker, Genera Plantarum, with Duranda Index.
Blanco, Flora de Filipinas, 1837.
Blanco, Flora de Filipinas, 1845.
Blanco, Flora de Filipinas, 4 vols. text, 2 vols. plates, edition of 1880, with Fern. Villars, Nov. Appendix.
Blume, C. L., Museum Botanicum Lugduno-Batavium, 2 vols.
Blume & Fischer, Flora Javae, 4 vols.
DeCandolle, Prodromus, 17 vols., with Buck's Index.
DeCandolle, Monographiæ Phanerogamarum, 9 vols.
Engler & Prantl, Naturlichen Pflanzenfamilien.
Hasskarl, Filices Javaniceæ.
Hooker, Flora of British India, 7 vols.
Hooker & Jackson, Index Kewensis.
Horsfield, T., Plantæ Javaniceæ Rariores.
Jackson, Guide to the Literature of Botany.
Kunth, Enumeratic Plantarum, 5 vols.
Kuntze, Revisio Generum Plantarum, 3 vols.
Kurz, Forest Flora of British Burma, 2 vols.
Louiero, Flora Cochinchinensis, 2 vols.
Maffei, Principales Especies Arboreo-Forestales de Filipinas.
Pritzel, Thesaurus Literaturæ Botanicæ.
Roemer & Scholtes, Systema Vegetabilium, 8 vols. with Mantissæ, 3 vols.
Rolfe, R. A., On the Flora of the Philippine Islands.
Smith, J., Enumeratio Felicium Philippinarum.
Trimen & Hooker, Flora of Ceylon.
Vidal, Flora Forestal de Filipinas, with atlas of 100 plates.
Vidal, Phanerogamæ Cumingianæ Philippinarum.
Vidal, Revision de Plantas Vasculares de Filipinas.
Watt, Dictionary of the Economic Products of India, 6 vols.
Willdenow, Species Plantarum, 6 vols.

The use of a thoroughly equipped laboratory for morphological work is offered by Dr. Coulter of the Manila Normal School. The government laboratories are now available for any special work on gums, gutta-percha, alkaloids and other vegetable products found in the islands.

With our small library and herbarium, and the short term of service (ten months) of the "scientific aids," it is hardly to be expected that results can be worked up in Manila, other than a preliminary report, but the more complete report will be made after return to the United States.

A set of all collections will be deposited in the United States National Herbarium, and, so far as possible, material will be supplied to the leading botanical institutions in the United States. To our present knowledge, the Philippine material now in the United States consists of the plants of Wright's United States exploring expedition at the Gray Herbarium, and probably also the Philadelphia Academy of Natural

Sciences and the New York Botanical Gardens—a partial set of Cuming's collection at the Gray Herbarium, a set of A. Löher's Philippine material at the United States National Herbarium, and some of Haenke's material, on which Presl's Reliquiæ Haekeaneæ was based, at the St. Louis Botanical Gardens. In Europe the most complete collection of material is at the Kew Gardens, consisting of the plants collected by Cuming, Löher, and the only complete set of Vidal's collections in existence.

In addition to the opportunity for travel and a year's experience in the tropics, in a practically unknown country from a botanical standpoint, it should be borne in mind that in Manila one is within comparatively easy reach of the famous botanical gardens at Buitenzorg, Java, at Singapore, and at Hongkong, each with a magnificent collection of growing plants from all portions of the tropics, extensive botanical collections and fine botanical libraries, the facilities of which, through the kindness of their directors, have been offered for the use of those American botanists who are working on the Philippine flora.

Mr. Merrill is under orders from this bureau (departed September 2) to visit the botanical gardens at Buitenzorg and Singapore. He will take with him a collection of botanical material for identification, and will also arrange for future collaboration at these places.

On July 1 of last year the following stations were established:

Angeles, Pampanga.
Aparri, Cagayan.
Arayat, Pampanga.
Aringa, Union.
Baguio, Benguet.
Batangas, Batangas.
Calumpit, Bulacan.
Cebu, Cebu.
Guianyangen, Tayabas.
Iloilo.
Laoag, Ilocos Norte.
Legaspi, Albay.
Lingayen, Pangasinan.
Lucena, Tayabas.
Malabon, Rizal.
Mariveles, Bataan.
Orani, Bataan.
Pasacao, Camarines.
San Fernando, Pampanga.
San Fernando, Union.
San Pedro Macati, Rizal.
Subig, Zambales.
Tacloban, Leyte.
Tarlac, Tarlac.

Stations on August 31, 1902.

Angat, Bulacan.
Aparri, Cagayan.
Arayat, Pampanga.
Bacolod, Occidental Negros.
Batangas, Batangas.
Cadiz Nuevo, Occidental Negros.
Capiz, Capiz.
Cavite, Cavite.
Cebu, Cebu.
Cottabato, Mindanao.
Cuyapo, Nueva Ecija.
Dumaguete, Oriental Negros.
Guinayangen, Tayabas.
Iligan, Isabela.
Iloilo, Iloilo.
Jolo, Jolo.
Laoag, Ilocos Norte.
Legaspi, Albay.
Lingayen, Pangasinan.
Lucena, Tayabas.
Malabon, Rizal.
Masbate, Masbate.
Misamis, Misamis.
Nueva Caceres, Camarines.
Orani, Bataan.
Pasacao, Camarines.
Pasig, Rizal.
Romblon, Romblon.
San Fernando, Union.
San Isidro, Nueva Ecija.
San Jose de Buenavista, Antique.
Santa Cruz, Laguna.
Santa Cruz, Zambales.
Sorsogon, Sorsogon.
Subig, Zambales.
Surigao, Surigao.
Tacloban, Leyte.
Talavera, Nueva Ecija.
Tarlac, Tarlac.
Tayug, Pampanga.
Vigan, Ilocos Sur.
Zamboanga, Zamboanga.

Orders have recently been issued to establish stations at Alcala and Claveria in the province of Cagayan.

REGULATIONS.

The recent legislation by Congress continues in force the present forestry regulations, but a careful revision of same is necessary and is now being prepared for consideration by the Philippine Commission by a board consisting of the chief and assistant chief of the bureau, three foresters, and one inspector. The present regulations have been in force since the organization of this bureau in June, 1900, and have been apparently satisfactory, but practical work in the field, where the work of timber cutters has been observed, has made clear the fact that fuller protection of the commercially valuable tree species must be provided. Operations for logging on a large scale by several companies are under way, and regulations must be prepared so that the government's interests will be protected, and at the same time enable the licensee to see his way clear to profitable enterprise.

A vast amount of mature timber should be cut as soon as practicable, and inducements should be offered private parties to remove such, and also all other timber which the forester deems it advisable to cut.

The regulations should provide for licenses under special contract for periods sufficiently extended so that companies will feel justified in installing plants large enough to do the work desired by this bureau.

The Filipino method of logging is very destructive and wasteful. The native logger is unable to handle large logs. As a rule he fells the tree before its maturity and at its best seed-bearing stage. The large trees have rarely been removed and will necessitate the use of the cable system of logging, railways, etc., all of which take large capital. A period of at least ten years should be granted in the contract license. These licenses should be granted to the highest bidder.

LICENSES.

Pursuant to the dispatch dated October 22, 1901, from the Secretary of War, licenses were issued and limited to thirty in number per province, and the amount of timber allowed to be cut was limited to 10,000 cubic feet for individuals and 100,000 cubic feet for companies. Licenses are issued without charge, but the forest product under the license is charged for as it is taken from the forest. Applications for licenses are made on blank forms furnished by the bureau.

The largest amount of timber cut on public land by any one company during the past year was less than 100,000 cubic feet, and not more than five licensees cut more than 50,000 cubic feet. The average cutting under a timber license which is granted for one year is less than 6,000 cubic feet. This small amount is due to the primitive methods of logging, lack of transportation, good roads, and labor.

Persons may take firewood from public land for their own domestic use without license. Licenses are required in order to take out firewood for the market or for use in any commercial enterprise.

Each forestry official in the province is furnished with blank forms of applications and is required to see that these forms are properly made out, and forward same with his approval or disapproval, stating reasons therefor in the latter case.

A modification of the present regulations will be recommended, as mentioned above, which will permit the granting of contract licenses, in which licenses an agreement will be entered into by which a company will agree to cut and remove within a reasonable time all timber selected for felling. A working plan of the forest where such rights are granted will show the varieties and amount of timber to be selected, length of haul, and average market prices of the better known varieties, cost of transportation, etc.; in fact, just such information as a logging company would require. To justify the installation of a modern plant for handling large and heavy timber, a company should be given in the license a term of at least ten years, and also the exclusive privilege in a specified district of cutting timber for the market; the local residents in said district to have every facility offered them to secure such timber as they may require for their own use at reasonable rates.

Under the suggested contract license the amount of timber marked for felling would probably be much in excess of the present limit of 100,000 cubic feet. It will take several well-equipped companies many years to cut a small part of the overmature timber which this bureau would be willing to mark for immediate removal.

The following are the forms of application for licenses at present in use:

APPLICATION FOR A TIMBER LICENSE.

——— ———,
———, 1902.

FORESTRY BUREAU, *Manila, P. I.:*

I hereby make application for a license to cut timber on the public lands in the province of ——— ———.

Location in province of timber ——— ———.

I am a resident of ——— ———.

I shall employ about ——— men for cutting and hauling timber.

My equipment for logging consists of ——— ———.

I will not cut or haul any timber under a gratuitous license.

I shall be prepared to cut and haul to shipping points during the year about ——— cubic feet of timber.

I fully understand the forestry regulations in force in these islands; will strictly comply with same, and will be responsible for the compliance with same of all parties operating under the timber license granted the undersigned.

——— ———,
——— ———.

Date: ——— ———.
Place: ——— ———.
Remarks: ——— ———.

——— ———, *Ranger.*

APPLICATION FOR A FIREWOOD LICENSE.

I hereby make application for a license to cut firewood on the public lands of the province of ——— ———, town of ——— ———.

I understand the forestry regulations governing the cutting of firewood and will comply strictly with the same.

I am a resident of ——— ———.

——— ———, *Applicant.*

Date: ——— ———.
Place: ——— ———.
Observations: ——— ———.

——— ———, *Ranger.*

APPLICATION FOR A GRATUITOUS LICENSE.

I hereby make application for a gratuitous license to cut timber on the public lands in the province of ——— ———, town of ——— ———.

I am a resident of the town of ——— ———, province of ——— ———.

The amount and kinds of timber required are as follows:

Classes of timber.	Dimensions.	Cubication.

I shall use this timber solely for the following purpose: ——— ———.

I understand the forestry regulations governing the cutting of timber under a gratuitous license and will comply strictly with the same, and will be responsible for the compliance with same by all parties operating under the gratuitous license granted the undersigned.

Neither the undersigned nor any of the parties cutting for him are holders of an ordinary license.

——— ———,
Applicant.

I hereby certify that this applicant, ——— ———, is a needy resident.

——— ———,
Municipal Presidente.

Date: ——— ———.
Place: ——— ———.
Observations: ——— ———.

——— ———,
Ranger.

APPLICATION FOR A DYEWOOD LICENSE.

I hereby make application for a license to cut and gather dyewoods on public lands in the province of ——— ———, town of ——— ———.

I am a resident of ——— ———.

I will not cut or haul any timber under a gratuitous license.

I understand the forestry regulations in force in these islands and will comply strictly with the same, and will be responsible for the compliance with same by all parties operating under the license requested.

——— ———,
Applicant.

Date: ——— ———.
Place: ——— ———.
Observations: ——— ———.

——— ———,
Ranger.

APPLICATION FOR A CHARCOAL LICENSE.

I hereby make application for a license to cut timber and other firewood on public lands in the province of ——— ———, town of ——— ———, for the purpose of making charcoal.

I am a resident of ——— ———.

I will not cut or haul any timber under a gratuitous license.

I understand the forestry regulations in force in these islands and will comply strictly with the same, and will be responsible for the compliance with same by all parties operating under the license requested.

——— ———,
Applicant.

Date: ——— ———.
Place: ——— ———.
Observations: ——— ———.

——— ———,
Ranger.

APPLICATION FOR A LICENSE TO EXTRACT GUMS AND RESINS ON PUBLIC LANDS.

I hereby make application for a license to extract gums and resins on the public lands in the province of ——— ———, town of ——— ———.

I am a resident of ——— ———.

I understand the forestry regulations in force in these islands and will comply strictly with the same, and be responsible for the compliance with same by all parties operating under the license requested.

——— ———,
Applicant.

Date: ——— ———.
Place: ——— ———.
Observations: ——— ———.

——— ———,
Ranger.

Statement of licenses granted during the fiscal year ending June 30, 1902, and for months of July and August, 1902.

JULY 1, 1901, TO JUNE 30, 1902.

[The black figures in column of timber licenses indicate the number of companies granted license to cut 100,000 cubic feet. All other timber licenses are for 10,000 cubic feet.]

Province.	Timber.	Firewood.	Gums and resins.	Dyewoods.	Charcoal.	Gratuitous.					Total licenses.
						For private needs.	Quantity.	For public works.	Quantity.	Total gratuitous.	
							Cu. ft.		Cu. ft.		
Albay	**2** 18	3						2	13,119	2	23
Antique	9	1				2	550	2	9,694	4	14
Abra	25	2				5	1,900	2	46,400	7	34
Bataan	28	22				7	2,398	9	48,496	16	66
Bulacan	16				2						18
Batangas	1										1
Benguet	5							1	5,200	1	6
Capez	17	11				21	8,732	2	14,000	23	51
Camarines Ambos	**1** 13	3	3								19
Cagayan	30	4						3	65,000	3	37
Cattabato	6	2	3					2	10,000	2	13
Cavite	5	11									16
Cebu	3										3
Davao	**1** 7	3	12	2							24
Ilocos Norte	15	1	1			3	567	12	60,250	15	32
Ilocos Sur	27	6	1					13	54,027	13	47
Iloilo	16	21		9	2			3	4,724	3	51
Isabela	10							5	40,000	5	15
Laguna	4	1						1	13,000	1	6
Leyte	**1** 19	6						5	38,056	5	30
Lepanto-Bontoc								1	6,500	1	1
Marinduque	**1** 16	9	1			1	1,000	3	72,800	4	30
Masbate	31	15	6	3		52	14,975	5	79,125	57	112
Misamis	14	1	1								16
Nueva Ecija	17	6				2	1,050	5	10,935	7	30
Negros Occidental	**1** 30	29	6					1	4,533	1	66
Negros Oriental	24	7				13	2,085	2	37,619	15	46
Pampanga	21	10				1	178			1	32
Pangasinan	25	10						6	41,020	6	41
Paragua	20	13	3								36
Rizal	20	9						1	4,000	1	30
Romblon	10	3	2			16	5,108			16	31
Sorsogon	15	4						2	10,250	2	21
Surigao	6	7				1	127			1	14
Tayabas	**1** 30	29	6	1	1	2	1,549			2	69
Tarlac	30	12				14	3,936	5	9,307	19	61
Union	18					3	616	4	40,166	7	25
Zambales	30	21	4	3	8	3	463	10	116,184	13	79
Zamboanga	**2** 31	6	13	1		3	1,474	4	40,000	7	58
Total	**10** 662	288	62	19	13	149	46,708	111	894,405	260	1,304

Statement of licenses granted during the fiscal year ending June 30, 1902, and for months of July and August, 1902—Continued.

JULY 1 TO AUGUST 31, 1902.

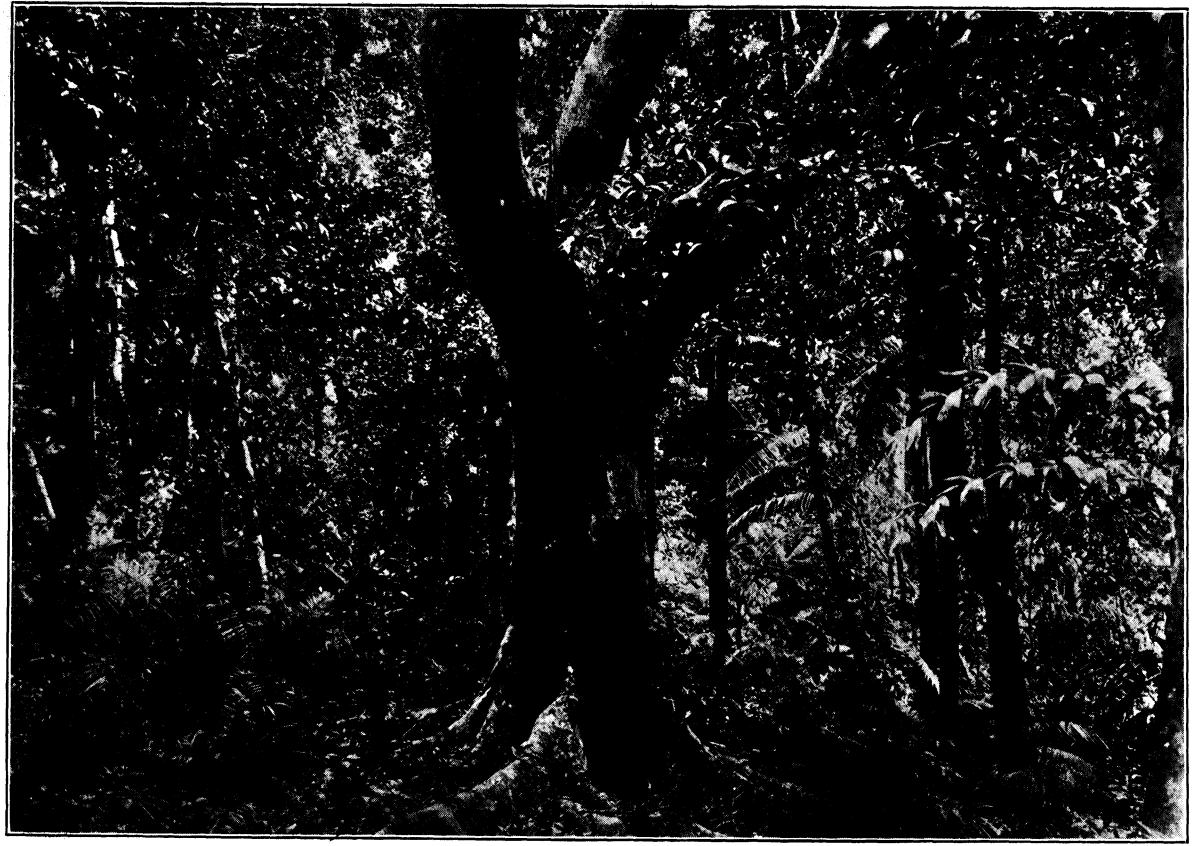
[The black figures in column of timber licenses indicate the number of companies granted license to cut 100,000 cubic feet. All other timber licenses are for 10,000 cubic feet.]

Province.	Timber.	Firewood.	Gums and resins.	Dyewoods.	Charcoal.	Gratuitous.					Total licenses.
						For private needs.	Quantity.	For public works.	Quantity.	Total gratuitous.	
							Cu. ft.		*Cu. ft.*		
Albay	3	2									5
Antique								1	5,000	1	1
Abra	8	2	1		4			1	2,500	1	16
Bataan	10	6				2	853	2	15,122	4	20
Bulacan	11	3			1						15
Benguet	2										2
Capez	7	2						9	5,031	9	18
Camarines Ambos	**1** 7	3		1	1			2	14,000	2	14
Cagayan	10	1									11
Cattabato	3	3	12	2							20
Cebu	1	1									2
Davao	6	2	11	2							21
Ilocos Norte	**1** 3										3
Ilocos Sur	11	2			1						14
Iloilo	16	9	1	3	1						30
Isabela								2	12,000	2	2
Laguna	2										2
Leyte	**1** 6	1									7
Marinduque	**1** 10	6	1	1							18
Masbate	9	6	1								16
Misamis	2							1	10,000	1	3
Nueva Ecija	10	2									12
Negros Occidental	**2** 8	6	1								15
Negros Oriental	5	4						1	1,620	1	10
Pampanga	8	5						1	25,000	1	14
Pangasinan	11	10						1	1,000	1	22
Paragua	5	2	1								8
Rizal	5	5									10
Romblon	3					5	2,790	1	3,000	6	9
Sorsogon	9	2						1	25,000	1	12
Surigao	9					1	600			1	10
Samar	1							1	35,000	1	2
Tayabas	**1** 18	13	2	1		1	700			1	35
Tarlac	19	10				6	1,380	2	2,100	8	37
Union	8										8
Zambales	2	1	1					1	3,000	1	5
Zamboanga	**1** 9	3	9	1		1	857			1	23
Total	**8** 257	112	41	11	8	16	7,180	27	159,373	43	472

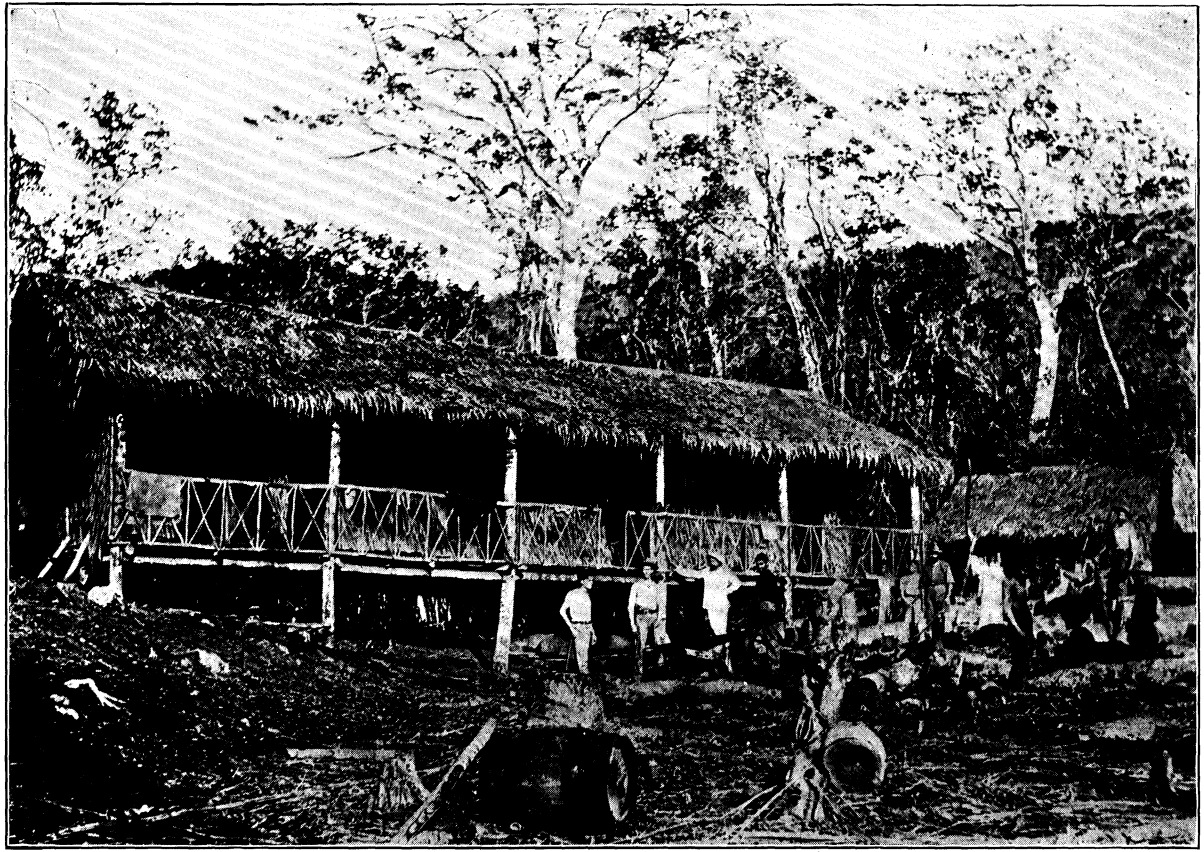
COST OF LOGGING IN THE PHILIPPINES.

A company or individual who has secured a timber license from the forestry bureau pays the following government stumpage per cubic foot, according to the grade of the timber:

	Cents.
Superior group	14
First group	10
Second group	8
Third group	3
Fourth group	2
Fifth group	1

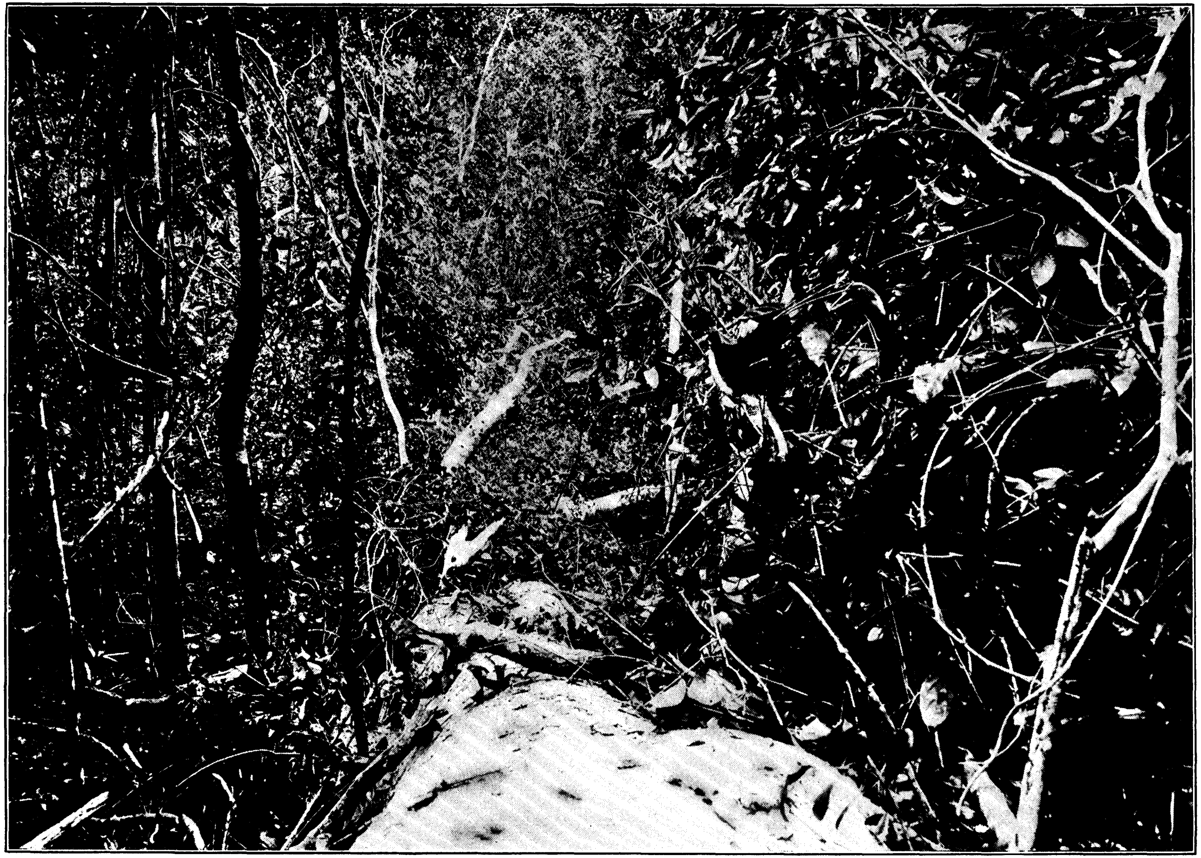


MOLAVE, SHOWING TYPICAL SHORT BOLE AND LARGE SPREADING LIMBS.

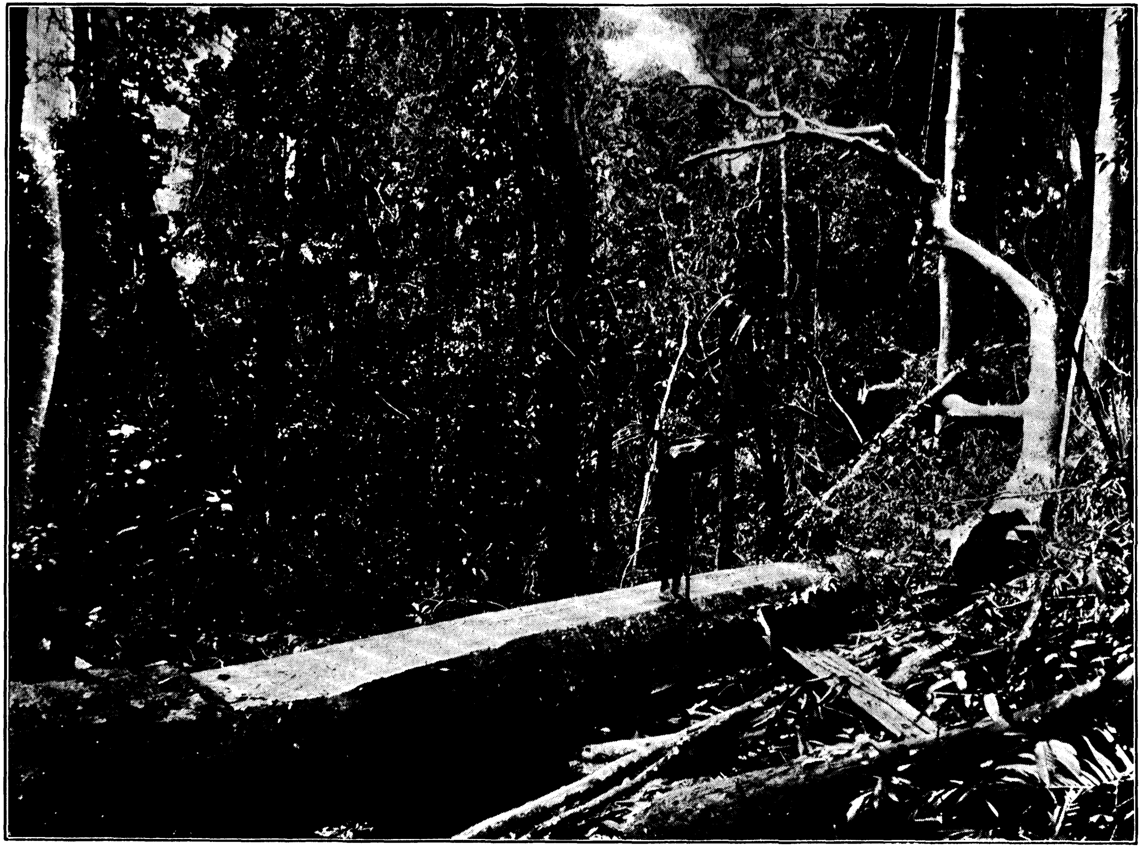


CAMP, MINDORO LUMBER COMPANY, BALER, TAYABAS.

TYPICAL DENSE UNDERGROWTH OF BEJUCO, WHICH PREVENTS ALL REPRODUCTION.

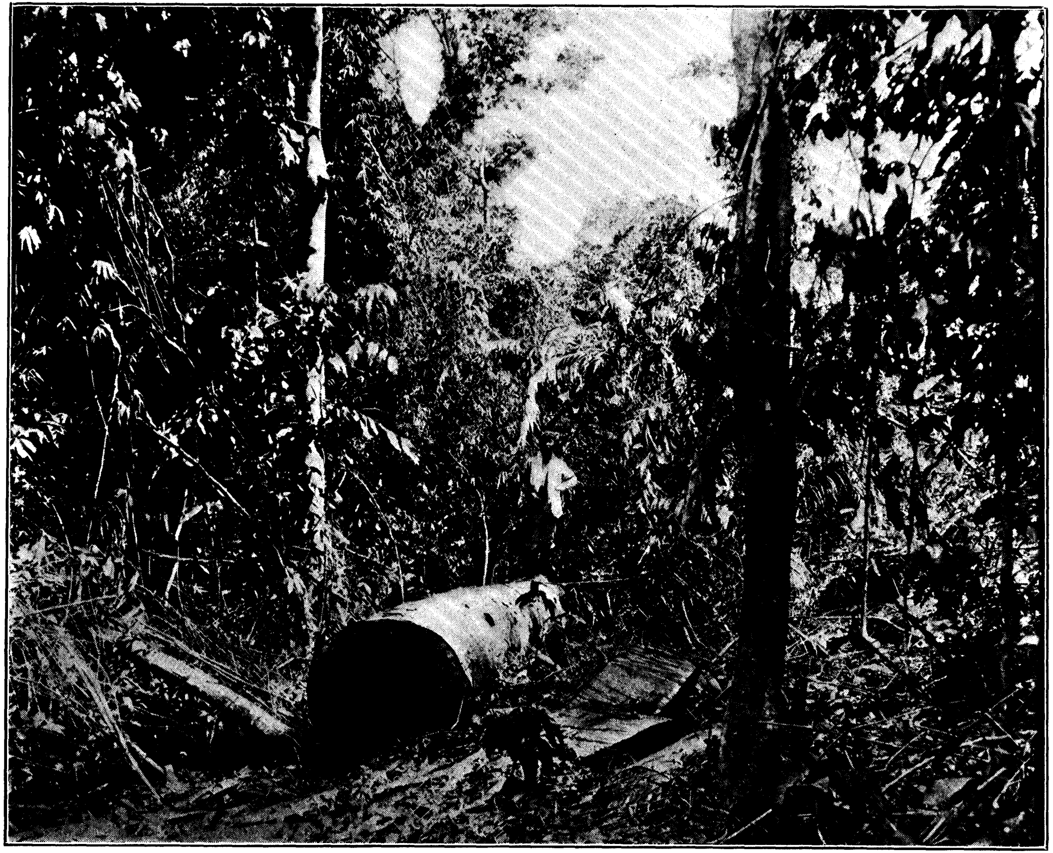


A CLEAN PATH CUT FOR OVER A HUNDRED FEET THROUGH THE FOREST BY THE FALL OF A BIG TREE.



TANGUILE CUT FOR BANCA, SHOWING WORKMEN HEWING.

Large opening made in the forest by fall of this one tree.



WASTE IN LUMBERING—FINE PANAO TOP LOG 40 FEET LONG AND 3 FEET IN DIAMETER, WHICH WAS LEFT IN THE WOODS TO ROT.

NOTE.—All moneys, other than salaries of forestry officials, mentioned in this report are in local or Mexican currency. The linear measure used by the native loggers, local concerns, and forestry bureau is the Spanish system. The Spanish cubic foot is equal to 0.76 of an English cubic foot.

On large operations, where the cutting includes trees of the superior, first, second, and third groups, the average government valuation has been found to amount to 10 cents per cubic foot. The total cutting by all parties shows that the average valuation is about 5 cents per cubic foot.

The price paid for labor in the woods varies according to the local demand; but the following average prices are believed to be approximately correct:

Choppers and hewers, 70 cents per day, exclusive of board; trail builders, skidders, and drivers, 50 cents per day, exclusive of board; hire of carabao, $1 to $1.50 per day.

Rinderpest has carried off thousands of carabaos, so that in some provinces the lack of these animals is a very serious problem, especially in agricultural work. Consequently the price or hire of carabaos varies considerably, according to local conditions. The cost of hauling with carabaos naturally varies, but on an average haul of from 1 to 3 miles it is customary to figure on about 20 cents per cubic foot.

However, nearly all the cutting, hewing, and hauling is done by contract, the timber companies paying the natives a certain price per vara and punto for squared timber delivered on the beach.

One of the successful companies operating in the Philippines pays according to the following scale:

Tariff for timber delivered on the beach.

IPIL, MOLAVE, ACLE, TINDALO, NARRA, YACAL.

Dimensions.			Prices.			Excess for each extra punto.	
Varas.	Puntos.	Puntos.	Pesos.	Reales.	Cuartos.	Reales.	Cuartos.
3	10	10	....	4	10	....	7
4	10	10	....	6	....	....	15
5	10	10	....	7	10	1	2
6	10	10	1	1	....	1	10
7	10	10	1	4	....	2	5
8	10	10	2	4	....	3	....
9	10	10	3	....	....	4	10
10	10	10	3	6	....	6	....
11	10	10	4	4	....	7	....
12	10	10	5	2	....	9	....
13	10	10	6	6	....	10	10
14	10	10	6	6	....	12	....
15	10	10	7	4	....	13	10
16	10	10	8	2	....	15	....

BANSALAGUIN, BANABA, BATITINAN, GUIJO, ARANGA, MALACADIOS.

5	10	10	....	6	....	....	7
6	10	10	....	7	10	....	15
7	10	10	1	1	....	....	15
8	10	10	1	4	....	....	15
9	10	10	1	5	10	....	15
10	10	10	1	7	....	1	10
11	10	10	2	....	10	1	10
12	10	10	2	2	....	1	10
13	10	10	2	3	10	1	10
14	10	10	2	5	....	1	10
15	10	10	3	....	....	3	10
16	10	10	3	....	....	3	....
17	10	10	3	6	....	3	....
18	10	10	4	4	....	4	10
19	10	10	4	7	....	4	10
20	10	10	5	2	....	6	....
21	10	10	6	....	....	6	....
22	10	10	6	3	....	7	10
23	10	10	6	6	....	7	10
24	10	10	7	4	....	9	....
25	10	10	7	7	....	9	....

Tariff for timber delivered on the beach—Continued.

BETIS AND DUNGON.

Dimensions.			Prices.			Excess for each extra punto.	
Varas.	Puntos.	Puntos.	Pesos.	Reales.	Cuartos.	Reales.	Cuartos.
8	10	10	1	7	....	....	13
9	10	10	2	2	....	1	10
10	10	10	2	5	....	1	10
11	10	10	3	....	....	2	5
12	10	10	3	3	....	2	5
13	10	10	3	6	....	3	....
14	10	10	4	1	....	3	....
15	10	10	4	4	....	4	10
16	10	10	4	7	....	4	10
17	10	10	5	2	....	6	....
18	10	10	5	5	....	6	....
19	10	10	6	....	....	7	10
20	10	10	6	6	....	7	10
21	10	10	8	2	....	9	....
23	10	10	9	....	....	10	10
24	10	10	9	5	....	10	10

MANCACHAPUY, SUPA, BANUYO, CALAMANSAY.

8	10	10	1	5	10	....	15
9	10	10	1	7	....	1	10
10	10	10	2	2	....	1	10
11	10	10	2	3	....	1	10
12	10	10	3	....	....	2	5
13	10	10	3	3	....	2	5
14	10	10	3	6	....	3	....
15	10	10	4	1	....	3	....
16	10	10	4	4	....	3	15
17	10	10	4	7	....	3	15
18	10	10	5	2	....	4	10
19	10	10	5	5	....	4	10
20	10	10	6	....	....	6	....
21	10	10	6	4	10	6	....
22	10	10	7	1	....	7	10
23	10	10	7	5	10	7	10

Nearly all the timber is cut in as long lengths as it is possible for the carabao to haul, and then in order to materially reduce the weight and save hauling slab and cull, the log is hewed on four sides in the woods.

The forestry bureau adds 25 per cent to the scale of the hewed timber to cover the loss of this material.

All the large mills are located in Manila and very little lumber is manufactured in the provinces. When the timber is cut in the provinces close to Manila, the squared timbers are often made up into rafts, with a large amount of bamboo, which is necessary in order to float the heavy Philippine timber. But when the sea trip is a long one, especially in the typhoon season, the timbers are shipped to Manila, usually on sailing vessels. The average freight to Manila may be figured at about 30 cents per cubic foot. This cost is much lower where the lumber company uses its own vessels.

The amount of timber which was received in Manila from the provinces from July 1, 1901, to June 30, 1902, is approximately:

	Cubic feet.
Public lands	1,787,225
Private lands	182,626
Total	1,969,851

MARKET PRICE FOR SQUARED TIMBER IN MANILA.

Within the last two years there has been an ever-increasing amount of building in Manila and also in many of the provinces. In consequence of this, especially as the demand far exceeds the amount which the natives are able to get out with the present lack of carabaos, the price of native and imported timber is steadily rising.

This is shown by the following prices paid for squared timber by the mills in Manila on May 4 and August 12, 1902:

Market price per cubic foot (Manila) for squared timber August 12, 1902.

Ipil	$2.00 to $2.50
Molave	1.80 to 2.50
Tindalo	2.00 to 2.50
Yacal	.80
Betis	1.00
Banuyo	.80
Amuguis	.60 to .65
Apitong	.60
Lauan	.45
Narra	1.00 to 1.20
Balacat	.45
Calantas	1.20
Acle	1.10

Market price per cubic foot (Manila) for squared timber May 4, 1902.

Ipil	$0.95 to $1.30
Molave	1.10 to 1.25
Tindalo	.95 to 1.30
Yacal	.80
Betis	1.00
Banuyo	.60
Amuguis	.55
Apitong	.35 to .45
Lauan	.40
Narra	.90 to 1.10
Calantas	1.10 to 1.15
Acle	1.10
Dungon	.80 to .90
Tanguile	.60
Guijo	.55 to .60
Batitinan	.50
Manicnic	.36
Mangasinoro	.40
Palo-Maria (Del Monte)	.30

This rapid increase may be partly accounted for by the small amount of timber shipped to Manila during the months of June and July, at which time, in many of the provinces, nearly all work was stopped on account of the cholera.

PHILIPPINE SAWMILLS.

There are but fourteen sawmills in the Philippine Islands using steam or water power. Eight of these are in Manila and six in the provinces, one at each of the following places: Caloocan, Paete, Tarlac, Tacloban, Island of Sibuyan, Santa Maria, Zamboanga, and Dulapoan. The description of the Manila mills will serve for all.

The following data were gathered with care, and unless the American lumberman has had experience in sawing very hard wood and understands logging methods in the Philippines he will be surprised at the figures given below.

The ordinary slowest feed on some of the saws which were set up recently in Manila was found to be too fast, for many logs seemed as hard as stone, and ripped out sawteeth and stopped operations in some of the mills only too frequently. The mill owners realize the value of a very slow feed and the value of first-class sawyers. In time as these woods are better known there will be fewer breaks in milling and the daily output for each mill will increase.

The following is a list of the eight Manila sawmills mentioned above, and also a list of the mills where the sawing is done by hand:

Sawmills in Manila using steam or water power.

Name of mill.	Machinery used.	Daily output in cubic feet.	Remarks.
Compania General de Tabacos de Filipinas.	1 band saw, 3 resaws, 4 planers, 1 gang of five saws.	40	At present this company is only cutting calantas for cigar boxes for its own use.
Spanish sawmill, No. 120 Calle Globo de Oro.	1 gang of three, 2 gang resaws, 1 circular ripsaw.	120	
Manila sawmill, 106 Reina Regente.	1 gang rip, 2 gang resaws	300	No stated output.
Rafael Perez, 42 Calle Soler	1 gang saw, 5 gang resaws, 2 band saws, 3 ripsaws.	500	
Clark's mill	Not running		
San Nicolas Iron Works	1 gang three saws, 1 circular ripsaw, not running.		Do.
Cadwallader & Co	1 band mill, planers, molders, and joiners.	1,000	
Bourns's mill	1 band saw, complete, with steam feed.	1,700	
Total output		3,660	

Spanish, Filipino, and Chinese mills sawing by hand.

Mill owner.	Number of men employed.	Number of saws used.	Daily output in cubic feet.
Maricano de Compe	9	3	36
Gregorio Here	15	6	72
Domingi Queen	7	2	24
Shee Chanco	6	2	24
Becinto Garcia	5	1	12
Co-Quinco	14	5	60
Maricano Arselano	9	3	36
Pablo Co-Quinco	26	11	121
Pablo Escolar	13	5	60
M. B. Sarata	18	3	36
Pablo Co-Quinco	11	4	48
Pio Barretto	39	17	204
Li-Ginco	12	4	48
Yu Sunquian	5	1	12
De Ching Co	9	3	36
Yeng Jungco Cuay & Co	10	3	36
Go-Tom Co	9	3	36
Di Yaco	9	3	36
Mariano Velasco	20	8	96
Yong Saco	13	5	60
To Tangco	6	2	24
Tableria de Tansamco	9	3	36
Tableria Antigua	8	3	36
Horacio J. Higgins	9	3	36
Chans Nan Co	17	7	84
Tang Yong	13	5	60
Yu Chico	15	6	72
Tan Tan Co	18	7	84
Tableria de Abreu	10	4	48
Rafael Go Tan Co	9	3	36
Ciriaco Cieya	11	4	48
Tan Tan Co	35	15	180
Do	13	5	60
Total	432	159	1,897

The above output is not equal to the demand, and in consequence prices continue high, and the hand mill alongside the steam sawmill is running at a good profit. As a rule it costs not less than 30 cents per cubic foot to saw by hand. Those sawing by hand are paid by the piece, as follows:

Class of timber.	Thickness of boards in inches.	Cost per cubic foot.
Ipil and tindalo	$\frac{9}{16}$	$0.39
Molave	$\frac{9}{16}$	.40
Yacal, banuyo, lauan, balacat	$\frac{1}{2}$	.39
Betis	$\frac{1}{2}$	.60
Dungon	1	.80
Apitong, narra, acle, guijo	$\frac{1}{2}$	.35
Tanguile, manicnic, batitinan	1	.28

One steam sawmill in Manila will saw into boards 1 inch in thickness and over for 17 cents per cubic foot. This price, however, applies only to a mixed shipment of logs. A higher charge is usually made for sawing molave, betis, dungon, and other especially hard woods. The other mills charge a higher price for sawing, ranging from 30 to 50 cents per cubic foot for ordinary timber; higher prices rule for sawing the very hard woods.

The market price for sawed stuff is so high that the loss of wood due to sawing with the circular saw was the reason one company discontinued using its circular saw and employed handsaws in preference, stating later that the change above noted was profitable to the company.

The reasons for the existence of the above conditions are as follows: A strong market, scarcity of logs, an uncertainty of the supply, and a lack of skill in handling steam sawmill machinery.

MARKET PRICE FOR MANUFACTURED LUMBER.

The following table shows the average prices of boards nine-sixteenths, seven-sixteenths, five-eighths, three-eighths, one-half, and 1 inch in thickness per cubic foot:

Lauan	$1.00 to $1.12
Tanguile	1.40
Manicnic	1.30
Molave	4.00 to 4.50
Dungon	3.00
Panao	2.00
Apitong	1.40
Narra	4.00 to 5.00
Tindalo	4.00
Ipil	4.00
Guijo	$2.25
Acle	2.50 to $3.00
Calantas	3.00
Batitinan	3.00
Yacal	1.80 to 1.90
Betis	2.00
Banuyo	1.50
Amuguis	.83
Balacat	1.12

IMPORTED LUMBER.

Several departments of the United States Government in these islands find it necessary to import several million feet of manufactured lumber from the United States and Borneo, owing to the high prices and scarcity of native lumber.

The average prices paid for the above lumber is as follows, in gold, per thousand:

Oregon pine, laid down at Portland, Oreg	$9.00
Oregon pine, laid down at Manila, from	21.65 to $26.50
Redwood, laid down at Manila	31.50
Borneo lumber, laid down at Manila	65.00

CORD WOOD.

Cord wood in the provinces costs from $4 to $7 per 1,000 rajas. Freight to Manila from $12 to $15 per 1,000 rajas.

Transportation by hand from dock to yards in Manila costs about $4 per 1,000 rajas. Licenses to sell cord wood in Manila cost $60 per year.

MARKET PRICE OF CORD WOOD IN MANILA.

Rajas, superior class, sticks 4 to 5 inches in diameter and 3 feet long, $40 to $50 per 1,000 rajas. (At the present time, August, 1902, the price is $56.50, but this is unusually high.)

Rajas, first class, sticks 3 inches in diameter and 3 feet long, $20 to $30 per 1,000 rajas.

Rajas, intermediate class, containing sticks of both superior and first class, $28 to $35 per 1,000 rajas.

Split sticks, about 2 feet long and 1 inch in diameter, three to four sticks for 1 cent, according to grade.

CHARCOAL.

Charcoal sells for $1 to $1.20 per sack, containing 27 "gantas." Most of it, however, is sold to the natives by the ganta, the price ranging from 10 to 12 cents.

THE FORESTS OF THE PHILIPPINE ISLANDS.

The various charts show from 948 to 1,725 islands, with a total area of about 119,542 square miles. Of this great number of islands the two largest are Luzon (47,238 square miles) and Mindanao (36,237 square miles). The next largest is Samar (5,040 square miles). There are eight others of more than 1,000 square miles and but six additional islands of more than 100 square miles, some fifty or more smaller islands of minor importance, thus leaving about 1,600 islands not worth mentioning, many of them nothing more than great masses of rock and sand, with little plant life visible.

The area of the Philippine Islands as given by various Spanish engineers runs between a little less than 70,000,000 to a little more than 73,000,000 acres. The forest area was estimated by Fernando Castro in 1890 at about 48,112,920 acres. This estimate includes all woodland, public and private. The area of private woodlands held under a good title is far below 1,000,000 acres.

All owners of private woodlands must register their titles to such lands in the forestry bureau at Manila before cutting for the market any timber or firewood on such property. If these titles are not registered in the forestry bureau, the wood cut is charged for as if cut on public lands. At present the total area of private woodland registered in this bureau is about 250,000 acres.

As far as we can learn from the former forestry officials in these islands no scientific examination was ever made of the stand of timber. This work is now being carried on by field parties from the forestry bureau. Field parties have examined the forests in the provinces of Bataan and South Camarines, and are now in the forests of Mindoro and Baler. These parties inaugurate their work by a preliminary reconnoissance of the region. They then make a detailed investigation of the amount and varieties of standing timber, measuring and noting carefully every tree included in the sample acres selected. A botanical collection is made at this time. A log at least 6 feet in length is taken from the tree from which the leaf, fruit, and flower are taken.

There are between 600 and 700 native tree species, of which there is some information, but there is great confusion in both scientific and popular names of tree species which it will take much time to correct. Upward of 50 species are found on an acre and several hundred species in a comparatively limited region. From Bataan Province alone we have valuation surveys on about 600 average acres, and before the work is closed some 500 more will be added. From these surveys much interesting information will be gathered concerning the stand and varieties of timber, their peculiarities of growth, character of the soil, and rock formation. (See chapter on Bataan.) In addition there will be notes on methods and cost of logging, labor, means of transportation, character of roads and streams, as well as a topographical map, on which will be shown the location of the valuation surveys, thus enabling any one to see at a glance the amount and value of timber available and the possibilities of bringing it to market.

This investigation will extend all over the islands, as trained men, capable of managing such work, are secured from the United States.

A preliminary examination of the forests of the Philippines shows that they have been almost entirely destroyed in many places. This line of destruction seems to follow the line of civilization. In Cebu—the first island settled by the Spaniards—almost every stick of merchantable timber has been cut away, and no good reproduction has ever taken place. In Panay and Negros, as well as in many provinces of Luzon, very little merchantable timber of a high grade is to be found.

A trip on the railway from Manila to Dagupan will not reveal much good timber within several miles of the road. In many of the islands the good timber has been cut away for about 3 miles back from the coast. But as we leave the centers of civilization, we soon run into virgin forests, where the stand of timber over 20 inches in diameter averages in places close to 7,000 cubic feet per acre; some sample acres show more than 10,000 cubic feet. In the total of forty odd million acres of woodland, we find at the very least 20,000,000 acres of virgin forest. We find virgin forests in the provinces of Cagayan, Isabela, Nueva Viscaya, and in that part of Tayabas formerly known as Principe and Infanta; in fact, the entire east coast of Luzon, south to Atimonan, is a virgin forest. The above-mentioned forests in Luzon will aggregate an area of at least 3,000,000 acres.

The above is a conservative estimate, and any change made later will undoubtedly be to increase the estimate instead of reducing it.

There is much merchantable timber left in the provinces of Tayabas, Camarines, parts of Bulacan, and Bataan.

The islands of Mindoro and Paragua, each containing an area of more than 2,000,000 acres, are covered with a dense stand of virgin timber

Mindanao, with an area of 23,000,000 acres, contains more than 10,000,000 acres of virgin forest. Samar and Leyte—both large islands—are heavily timbered.

All of these latter islands are well supplied with water courses sufficiently large for driving logs. Many of these streams need a little clearing before driving could begin. One fine tract of timber near Manila has been protected up to the present time by a small obstruction in a stream that an American logging company would have removed in a very few days and at slight expense.

A glance at the topography of the islands will show the logger that the average length of haul to tide water is a short one. A combination of a short line of railway with the wire-cable system of logging would be ideal for a country with a topography such as these islands present. The methods of logging are very crude, as the carabao is relied upon as the principal means of transportation. The methods of felling trees are slow and antiquated. Wasteful methods of cutting are evident everywhere, and it is extremely doubtful if an average of 35 per cent of the merchantable timber cut is taken from the forest to the market.

Several hundred varieties of native woods are received in the Manila market during the year. Spanish engineers tested and described only some 70 varieties, so that we have many species in the market to-day that are not popular, owing to the lack of reliable information concerning their strength, durability, and suitability for construction purposes. Where strength and durability are especially desired there are no finer construction woods in the world to-day than molave, ipil, and yacal.

There are many other native woods which, when tested, will find a place with those just mentioned.

We have a number of woods which will attract the fine-furniture makers, of which may be mentioned narra, tindalo, camagon, ebano, calamansanay, tucan-calao, and alintatao. These varieties are found all over the islands. We find also 11 different oaks, cedar in abundance, teak, and many other species awaiting investigation to bring out their value.

At this time no more than a mere mention will be made of the fact that there are large areas in the southern islands of this group where gutta-percha and a good quality of rubber are found. (See appended report of Dr. Sherman and statistics of forest products used during the year.) The islands are rich in other gums, in a great variety of valuable dyewoods, and other forest products that time and enterprise will develop.

At present very little cutting is going on in the virgin forests of the islands. Nearly all of the cutting is found in those provinces and islands which have been cut over for many years. Two or three licensees have established themselves at good points in virgin tracts, and there is no reason why satisfactory returns should not be realized from cuttings in such places.

It would be difficult at this time to even approximate the present value of the timber on public lands in the Philippines. Statistics of this office show that several hundred varieties of native woods are brought to market in the islands and are disposed of at a fair price. The government charges for the past year on this great variety of woods averaged a little over 6 cents Mexican per cubic foot Spanish. This charge has continued to remain between 5 and 10 per cent of the market price of timber in Manila.

It will be safe to assume an average stand of about 3,500 cubic feet English or 4,600 cubic feet Spanish, although the valuation surveys give double this estimate of merchantable timber (over 20 inches in diameter) on each acre of the 20,000,000 acres of virgin forests in these islands.

At the above valuation of 6 cents per cubic foot, it is evident that the value to the Philippine government of the above timber is more than $100 gold per acre. By removing this timber under the supervision of forestry officials, each forest tract will gradually improve in value, and while realizing the large sum mentioned, the value per acre of public timber land will eventually approach its true and permanent value, which will be much nearer $200 gold per acre than $100; i. e., after the great mass of mature and overmature timber is removed, the revenue from the sale of the annual increase of growth of public timber will, under careful supervision, bring to the state a fair interest on the valuation per acre as given above.

The remaining public woodland, about 28,000,000 acres, will average in value not less than one-half the value as given for the virgin forest. A small part of this remaining woodland will be taken up as mineral land and for agricultural purposes. After three centuries of civilization in the islands, we find but 6,000,000 acres improved out of a total area of 63,000,000 acres. It will be safe to assume that the forestry bureau will have at least 20,000,000 of the 28,000,000 acres to protect and improve for many years to come. This area, added to the 20,000,000 acres of virgin forest, will give to the state an area of 40,000,000 acres of valuable woodland.

By diverting the efforts of the timber cutters to the virgin forests, and by a rigid protection of the remaining woodland, the value of the total area will, in about thirty years, reach a value undreamed of to-day by those not familiar with what rational forestry is capable of accomplishing.

The United States market is not considered in this proposition. The Philippine market will be strong for many years. The Chinese market is always strong, and always will be, as all of lowland China is without timber. The Philippine construction timber is considered by many engineers in China the best timber to be had in the Orient. Strong as has been the Chinese market for timber in the past, the future promises even better, as there are indications that foreign enterprise and capital are securing concessions which will awaken that vast Empire.

PRIVATE WOODLANDS.

Article 75 of the forestry regulations provides as follows:

"Persons owning lands containing trees suitable for lumber, firewood, or other forest products, shall immediately present certified copies of their title deeds at this office for registration. Forest products taken from private lands whose owners have not complied with these requirements shall be considered unlawfully taken."

Up to the present date 103 titles to private woodlands have been registered in this bureau, as prescribed in the above-mentioned article. These lands are owned by 13 companies and 90 individuals.

The aggregate area of the woodland registered by the 13 companies is 55,757 hectares, an average of 4,289 hectares.

The aggregate area of woodland registered by the 90 individuals is 44,575 hectares, an average of 495 hectares.

The following is a list of provinces, giving the number and area of private woodlands registered from each.

Woodlands registered.

Name.	Individuals.						Companies.			Total.		
	Individuals.	Companies.	Total.	Hectares.	Areas.	C.	Hectares.	Areas.	C.	Hectares.	Areas.	C.
Romblon	2	....	2	649	92	50	....	....	....	649	92	50
Tarlac	22	3	25	17,216	80	95	10,637	12	40	27,853	93	35
Pampanga	48	2	50	2,508	66	83	4,241	48	00	6,750	14	83
Davao	2	....	2	1,150	00	00	....	....	....	1,150	00	00
Mindoro	1	1	2	916	00	98	23,266	00	00	24,182	00	98
Isabela	1	5	6	607	50	00	12,543	1	14	13,150	51	14
Bataan	1	....	1	2	79	50	....	....	....	2	79	50
Pangasinan	2	....	2	6,583	90	15	....	....	....	6,583	90	15
Nueva Ecija	4	1	5	12,668	79	40	418	7	13	13,086	86	53
Laguna	1	....	1	195	71	62	....	....	....	195	71	62
Zamboanga	1	....	1	159	00	00	....	....	....	159	00	00
Rizal	....	1	1	....	....	....	4,651	20	12	4,651	20	12
Bulacan	2	....	2	644	96	73	....	....	....	644	96	73
Negros Occ	1	....	1	293	62	80	....	....	....	293	62	80
Camarines	1	....	1	923	60	72	....	....	....	923	60	72
Manila	1	....	1	54	56	00	....	....	....	54	56	00
Total	90	13	103	44,575	88	18	55,756	88	79	100,332	76	97

1 hectare = 2.4711 acres.
C = centiareas.

A few of the largest holdings registered are as follows:

	Hectares.
Order of Recolletos, Mindoro	23, 266
Compañia General de Tabacos, Luzon	21, 494
Francisco Gonzales, Luzon	20, 881
Marcelino Santos, Luzon	13, 202
Justo Porcuna, Mindoro	916
Rafael Calvo, Luzon	923
Santiago Molino, Mindanao	850
Ayala y Ca, Luzon	3, 675
Compañia General de Filipinas, Luzon	4, 651

The amount of timber, firewood, and charcoal taken from the above lands during the fiscal year ending June 30, 1902, is:

Timber	196, 987 cubic feet.
Firewood	43, 854 cubic meters.
Charcoal	9, 562 cubic meters.

As soon as practicable the division of forestry management will take charge of investigating the amount of timber and other wood on private woodlands registered or to be registered in this bureau.

The report of each investigation will be attached to the record of forest products taken from said land, and will act as a check on those parties who occasionally forget boundaries and by mistake or otherwise take timber from adjacent public land.

FOREST MANAGEMENT.

Up to the present time the lumbering operations in the Philippine Islands have been very primitive, without any system or thought of forest management. The actual cutting in the forest is carried on almost exclusively by the natives, who either cut and haul on contract or else sell the hewn timber to lumber companies or Chinese buyers.

The forestry bureau issues licenses to cut timber on public lands, specifying a special district in a province and the amount of timber which shall be removed.

In most cases the licensee makes a verbal contract with the loggers, paying them a fixed price per cubic foot for certain species of hewn timber, either delivered in the woods or at some given point, usually on the beach.

The licensee naturally instructs his workmen to cut the most valuable species which will necessitate the shortest possible haul. So the loggers pick out the best tree they can find, chop and burn it down, taking as long a log as they think their carabao can haul, and leaving the remainder (often as much as 40 to 60 per cent) to decay in the woods.

In consequence of this system of logging, the forests on many of the islands have been culled for a distance of from 2 to 3 miles back from the coast line and in the vicinity of all the large towns in the interior.

The tremendous weight of the Philippine woods, together with the slowness and expense of hauling with carabaos, has left the more distant forests absolutely untouched. The young growth on the lands which have been cut over is very largely composed of the inferior species, which is the natural consequence of the native custom of cutting only the most valuable species.

Unless the lumber companies change their methods and cut out the less important species together with the more valuable trees, artificial reforestation of the latter will in time become necessary. In this connection the following quotation from Forestry in British India, by B. Ribbentrop, inspector-general of forests to the government of India, is pertinent:

"The treatment of forests of this kind, in view of the natural regeneration of the most valuable species whilst exploiting these, the only marketable trees the forests frequently contain, is perhaps one of the most difficult problems in forestry. The consequence is that though often it is a matter of no great difficulty to insure reproduction in this class of forest by protective measures only, it is by no means an easy problem in Indian forestry to promote the production of the more valuable kinds and to prevent the deterioration in the character of the peuplement of the forests, which, without special attention to this point, must, it is very evident, result from the removal of parent trees of the more useful kinds only."

Under forest management, in order to improve the condition of the forest, it will be necessary to mark for cutting all the over-mature timber which will pay the least margin of profit over the cost of removal.

This will mean the felling of a considerable number of trees per acre, and the large tops, if left in the woods, will cover so large a part of the openings as to seriously retard reproduction. Under the present system of lumbering, the cutting is on such a small scale and so widely distributed that the scattered tops do very little harm, and the amount of merchantable wood left in the tops in any one locality is comparatively insignificant.

The great objection to this method, however, is that these blanks are restocked with very inferior timber, as most of the valuable trees within seeding distance have been cut and will be eliminated from the stand for many years.

It will be necessary in the Philippines to depend upon natural reproduction for restocking our forests.

Very fortunately we have an enormous area of almost virgin forest, and with careful forest management all land more suitable for forests than for agriculture should be kept under timber.

The most difficult point will be to increase or even maintain the present percentage of valuable merchantable species in the total stand.

In certain sections where the valuable species are greatly outnumbered, and on bare slopes which it is important should be restocked, artificial seeding or planting may become necessary.

Up to the present time the hard-wood forests of the islands have been immune from fire for the reason that there has never been sufficient dry inflammable material to create a fire of sufficient force and heat to sweep through the forest.

But when the forest is full of large down tops, held above the soil by their branches, and so allowed to dry out thoroughly, and also remain sound and hard for many years, the danger from fire will be far greater, and it is not at all improbable that large bodies of timber will be destroyed.

In all the logging operations in the islands a large percentage of clear lumber below the crown is left in the woods, eventually to rot, but for many years before that occurs it will suppress most of the young growth in the openings formed by the fall of the trees, and furnish well-seasoned wood in the event of a forest fire.

In order to localize the cutting so that the ranger can exercise an intelligent supervision over the work, all timber should be marked by a competent official of the forestry bureau.

One forester can mark enough timber in a few days to keep the largest lumber company in the islands busy for some time.

Each tree selected should be stamped with a Government marking hatchet both on the stump and on the flare of the roots, so that after the removal of the tree, even though a very low stump has been cut, it could be readily determined whether the tree had been marked for cutting or not.

In case a tree is cut which has not been marked, a heavy fine should be imposed.

In all large operations the individual or company holding a license should be obliged to enter into a contract with the forestry bureau and also give a bond to carry out the work according to the forestry regulations.

After the timber has been marked and the cutting commences, the rangers should be instructed to inspect the cutting frequently, and see to it that long tops containing clear lumber are not left in the woods. Also, after repeated violations of the forestry regulations and terms of contract, all lumber and logs of the licensee, in the forest or vicinity, should be seized and held until the clear logs in the tops are cut and removed.

Licensees should have the free use of all lumber and wood in the tops (after logs 6 feet long and 12 inches at the small end have been cut and removed) to work up into box boards, staves, shingles, firewood, charcoal, etc. If this is done, the tops will be cut up to such an extent that they can be readily burned, and this the licensee should be obliged to do toward the end of the dry season when the wood is thoroughly seasoned.

In case the licensee does not make use of the small wood in the tops he should be obliged to pile the branches around the main crown, and at the end of the dry season burn the whole thing. Such a rule, and the careful selection and marking of the timber which should be cut, will enable the forester to make the main improvements over the present methods of logging. Concentrated lumbering and the removal of a far greater number of trees per acre will make it extremely important that good clean work be done, and to do this contracts are absolutely necessary.

This will be especially true when large companies install a wire-cable system of logging.

However, the introduction of American methods of lumbering, especially the adoption of the "bull donkey" and wire cable system, will make possible the practical, conservative exploitation of many species which with the present antiquated methods is impossible.

With a crosscut saw the natives can not only cut lower stumps, but they will also do the work in about one-half the time which it takes at present.

Under present conditions, however, the main reason for cutting high stumps is that it would be very difficult, if not impossible, for carabaos to haul the heavy butt log.

Consequently the native logger cuts his stumps anywhere from 10 to 14 feet high, takes one long log, and wastes as much good clear timber as he utilizes.

On account of the same difficulties and limitations when hauling with carabaos the large overmature timber, which should be cut and removed first of all, is very seldom taken.

The native realizes perfectly the work that is ahead of him and his carabao if he fells one of these big trees, and consequently he selects one of a medium diameter, which does not present such difficulties.

It is self-evident that such a system is not only bad for the forest but also extremely wasteful, for these large trees which are left to decay and fall, contain the very finest grade of timber,

With an engine and wire cable, which can easily haul from 800 to 1,000 cubic feet of logs at one load, it would be natural to remove this large timber on the first cut.

As previously stated, the forestry bureau should mark for cutting all mature trees which will pay any margin of profit over the cost of removal, for unless this is done the forest will ultimately consist of only the less valuable species.

At the present time there is a large number of trees which are not being cut or utilized, and in order to determine the merchantable value of these species a timber-testing laboratory has been established, as noted in another chapter. In this way it is hoped to make a market for a number of forest trees which have heretofore never been cut, for the simple reason that the natives have always taken the very finest woods.

In order to establish an intelligent forest policy it is absolutely imperative to determine the extent of the Philippine forests and the species of which they are composed. This work and the arrangement of detailed working plans for large and valuable tracts of timber is assigned to the division of forest management. The field work was started in December, 1901, and up to the present time detailed examinations have been made of three important forest areas, viz: Bataan Province, the southwest coast of the Camarines, and the northwest coast of Mindoro.

In order to determine very accurately the amount and composition of both the mature and young growth in the forest, acre valuation surveys are taken.

These acre surveys are run in strips through the timber; in the valleys, along the coast, on flats, lower and upper mountain slopes, and in fact all aspects and situations, so as to secure a record of the average stand of timber in all localities.

The strips are measured with a surveyor's chain, and are 66 feet wide and 660 feet long. All trees on this strip, usually down to a diameter of 8 inches, are measured with calipers and recorded on a valuation sheet, under their respective species and diameter.

A topographical map is made with special reference to important bodies of timber, together with the important rivers, valleys, and harbors, all of which are extremely important in connection with the transportation of the material. At the end of each acre, careful notes are taken to cover the following points, viz: Situation, course, altitude, slope and aspect, rock, soil, humus, ground cover, underbrush, reproduction, density, quality of locality, sylvicultural condition, merchantable condition, damage, remarks.

With the hypsometer, a German instrument, the merchantable length and total height are recorded for a large number of important species, and these data, when applied to the results of the valuation surveys, give a very close estimate of the merchantable stand.

The merchantable amount of each species is known, and also, which is quite as important, the amount and character of the young growth which will form the future forest.

As will readily be seen, from what has been said, the future condition and welfare of the forest rests very largely with the forester and is determined by the trees which he marks for cutting. Naturally in a forest where the percentage of the valuable species is far below what it could be made by means of careful forest management, it would be the worst possible policy to allow the lumber companies to cut out only the most valuable species and so secure a forest of inferior species for the future.

Report of the Forest Conditions on the Southwest Coast of the Camarines, and the Operations of the Philippine Lumber and Development Company.

The tract of forest land which is being operated by the Philippine Lumber and Development Company extends along the southwest coast of the Camarines from Bangon to Hamuroan and back from the coast to the main watershed, the highest point of which is Mount Hantic, at an elevation of about 2,145 feet. Approximately this area comprises 169.88 square miles (108,680 acres), about 74,100 acres of which contain good timber.

With the exception of the valleys, the land from Binahian to Cotmo rises abruptly from the coast, but in the Caranan, Tinalmud, and Caima valleys there is some fine bottom land which extends back from the shore for a considerable distance.

There are six main valleys in this region with streams of a fair size, viz: Ragay, Caima, Tinalmud, Caranan, Pasacao, and Cabasanan. None of these so-called rivers are drivable, but the valleys are all broad enough to make the construction of main logging roads comparatively easy.

The valleys contain a considerable amount of rich clay and loamy soil, apparently capable of growing almost any field crops. At present there are some good-sized hemp and banana plantations, especially in the Caranan, Tinalmud, and Caima valleys, most of which, however, have been abandoned and allowed to grow up to weeds since the outbreak of the insurrection.

Higher up in the mountains are many small settlements of from one to four houses, with clearings of from five to thirty acres.

The following table gives a rough estimate of the private land in the inspected area, including ownership, amount of cultivated land, and the present crops:

Private land—Area table, in acres.

Compartments.	Abaca.	Rice and corn.	Gardens, including sugar.	Cocoa.	Grass.	Brush.	Forest.		Total.
							Swamp.	Hilly.	
1. Bangon	123.5	123.5	98.8	24.7	123.5	494	49.4	197.6	1,235
2. Binahian	49.4	24.7	49.4	....	123.5	123.5	49.4	74.1	494
3. Caima	....	....	....	....	1,482	123.5	247	123.5	1,976
4. Baao	24.7	49.4	24.7	....	1,111.5	123.5	74.1	74.1	1,482
5. Cambalidio	74.1	49.4	74.1	....	247	617.5	49.4	123.5	1,235
6. Tinalmud	815.1	123.5	98.8	24.7	247	741	49.4	123.5	2,223
7. Dalupaon	74.1	74.1	49.4	....	49.4	247	....	....	494
8. Caranan	494	123.5	98.8	24.7	74.1	741	49.4	123.5	1,729
9. Pasacao	3,705	247	247	49.4	74.1	3,458	123.5	741	8,645
10. Catmo	24.7	24.7	24.7	....	....	123.5	....	49.4	247
11. Bagolatao	....	24.7	24.7	....	49.4	123.5	....	24.7	247
12. Hamuroan	49.4	123.5	74.1	....	123.5	494	49.4	74.1	988
Total	5,434	988	864.5	123.5	3,705	7,410	741	1,729	20,995

The following table for the public lands is also approximate:

Public lands (acres).

Compartments.	Grass.	Brush.	Forest.		Unproductive district.	Total.	Total State and public lands.
			Swamp.	Hilly.			
1. Bangon	247.0	494.0	494.0	4,940	....	6,175.0	7,410
2. Binahian	494.0	247.0	494.0	3,705	....	4,940.0	5,434
3. Caima	1,605.5	321.1	1,160.9	4,940	123.5	8,151.0	10,127
4. Baao	123.5	247.0	247.0	4,446	617.5	5,681.0	7,163
5. Canbalidio	247.0	494.0	247.0	8,398	494.0	9,880.0	11,115
6. Tinalmud	172.9	494.0	247.0	8,398	1,556.1	10,868.0	13,091
7. Dalupaon	24.7	247.0	24.7	5,187	444.6	5,928.0	6,422
8. Caranan	24.7	494.0	123.5	6,669	345.8	7,657.0	9,386
9. Pasacao	123.5	1,729.0	370.5	8,892	247.0	11,362.0	20,007
10. Catmo	....	172.9	74.1	6,916	494.0	7,657.0	7,904
11. Bagolatao	24.7	123.5	98.8	3,705	247.0	4,199.0	4,446
12. Hamuroan	123.5	370.5	123.5	4,199	370.5	5,187.0	6,175
Total	3,211.0	5,434.0	3,705.0	70,395	4,940.0	8,768.5	108,680

Of this total area of 108,680 acres, the Government owns about 87,685 acres, of which 74,100 acres are almost virgin forest, 8,645 acres grass and brush land, and about 4,940 acres of more or less unproductive area, in the form of streams and very steep, rocky slopes and ridges. The rest of the tract, about 20,995 acres, is believed to be private land, partly scattered along the coast and over the plateau in the center of the forest, more concentrated along the lower and middle courses of the streams.

The private land is covered principally with brush (7,410 acres) and abaca, wrongly called hemp (5,434 acres). Only a small portion is real timber land (1,729 acres), swamp forest (741 acres), rice and cornfields (988 acres), plantations of sugar cane, vegetables, cacao, etc. (1,011.5 acres), cocoa palms (123.5 acres).

Much of this grass and brush land, and even a large area of the forest, is claimed by private parties, but so many of these claims have faulty titles that it is safe to consider as Government land at least as much as is shown in the above table.

Two men of Nueva Caceres, Camarines, seem to be the largest private owners; one controls almost half of the Congonal of Caima and the other has large abaca fields, brush, and timber forests south of Batang in the Pasacao Valley. The rest of the private land is mostly divided into small holdings. Abaca is the principal product and is exported on a large scale. Corn, rice, cocoanuts, bananas, various vegetables, cacao and other tree fruits are cultivated for domestic use and grow well there. Abaca fields lie mainly in the valleys of Pasacao, Cabasanan, Tinalmud, Canbalidio, and Caranan.

CLIMATE.

Along this coast heavy rainfalls and strong winds are of frequent occurrence—from the northeast in the winter and spring, and from the southeast in summer and autumn. The northeast monsoon might be expected to arrive in a fairly dry condition, but, on the contrary, a great amount of moisture is recorded, due to the short distance between the two coasts of this province and the lack of high mountains near the Pacific coast northeast from the tract.

Several months are very wet; from November to March scarcely a week passes without showers, and sometimes the rain falls without cessation for entire weeks at a time. Considerable rain also falls during the other months of the year. April, August, and October seem to be the dryest months, but even during that period a two weeks' stretch of dry weather is an exception. For this reason the vegetation is very rich, both in variety and quantity. The temperature is fairly even, varying from 60° F. in January to 90° F. in April and May, the general average being between 80° and 86° F.

TOPOGRAPHY.

Along the coast between Punta Carvenig and Hamuroan the shipping of timber is almost entirely restricted to the season of the northeasterly winds (from November to May), while the months of the southwest monsoon (from June to November) makes shipping usually impossible because (with the exception of the bays of Binahian and Ragay, where loading is possible at all times) there is no protected bay or harbor in the entire licensed strip. Several capes jut out into the sea, but only Punta Carvenig and Octoc far enough to stop the high waves of the open sea. The bays are too shallow to allow vessels to load directly from the shore. It is necessary for them to anchor about half a mile outside of the bays of Binahian and Ragay, about one-quarter of a mile outside Tinalmud, Caranan, Pasacao, Hamuroan, and Gotosan, and a short distance outside of Dalupoan, Cotmo, and Bagolatao. Along the coast there are some steep cliffs and ridges, thrown up by heavy volcanic action. As a general rule these are well timbered, but with the present system of carabao logging the problem of transportation is a very difficult one.

Back from the cliffs the land slopes more or less gradually for 6 or 8 miles to the top of the main watershed.

DESCRIPTION OF THE FOREST.

With the exception of the six valleys mentioned above, and also a few unimportant valleys which have small clearings near the mouth, the forest extends to the seacoast. The conditions of the entire forest are very similar.

Mr. John Orr, who is the manager of the Philippine Lumber and Development Company, and who has charge of their logging operations, cuts the following species, which at present includes all those timber trees of the province which are considered merchantable.

Superior group.—Calantas, camagon, dungon, ebano, molave, tindalo, ipil, and narra.

First group.—Acle, batititnan, betis, calamansanay.

Second group.—Amuguis, aranga, bangcal, banuyo, bolong-eta, malacadios, Malacatmon, mangachapuy, mangasinoro, palo-maria, supa, tanguile, tucan-calao.

Third group.—Apitong, bitoc, palo-maria (del monte) calumpit, lauan.

Fourth group.—None.

Fifth group.—Bacauan, tangal.

The Philippine Lumber and Development Company have found that 3 miles in a straight line, or 5 miles, following the winding of the valleys, is the extreme limit of profitable lumbering with the carabao, so that the bulk of the timber on main mountain slopes is still untouched. Most of the timber is very scattering, with no pure stands of any one species, so that in order to lumber profitably, it will be necessary to cut all the merchantable species.

In running the valuation surveys, where all timber, down to 8 inches in diameter, is measured on acre strips, it was found that the following species predominated in the forest near Dalupoan: Apitong, macaasin, dungon, lauan, molave, palo-maria (del monte) guijo, catmon, camagon, mangachapuy, tucan-calao, balete, bolong-eta, pili, betis, calamansanay, banuyo, and calantas; also some scattering acle, malacadios, amuguis, calumpit, and tindalo.

Apitong, lauan, and alahan are almost equally distributed, forming the greater part of the forest.

Between Ragay and Binahian is a good stand of molave and dungon. On the slopes back of Binahian is a fair stand of calantas, which also occurs in considerable quantity along the head of the Caranan Valley, and between Cabasanan and Cotmo. On the seacoast north of Binahian is a fair stand of ebano, but this is the only place in which it was found. Palo-maria occurs along the seacoast over the whole country. Where the banks of the rivers are very low, as in the case of Ragay and Ciama, a heavy growth of inferior trees, such as tangat, padagpad, and some species which are good for firewood, has taken possession.

The best stand of timber occurs north of Tinalmud and on the slopes of the Titis and Hantic mountains. It will readily be seen from the above that the forests in this section of the Camarines contain an unusually large number of superior, first and second group trees, all of which are very valuable; but on the other hand many of these species as they occur in the Camarines are short-boled (apitong being a notable exception), with large overdeveloped crowns, which take up a very large amount of space in the forest, suppressing young growth.

Mr. Orr estimates that about 30 per cent of the apparently sound timber must be discounted for unseen defects and cull. It would unquestionably be perfectly safe to allow the company to cut four or five times as much timber as they are removing annually, for there is an enormous amount of overmature timber in the forest whose removal will greatly facilitate the growth of the young timber and the reproduction of the more important species.

The following list gives the generic and local name of the species collected in the Camarines, and the group under which each is listed:

Generic name.	Local name.	Group.
Terminalia edulis, Blanco	Calumpit (in Bicol: Calumayon)	III.
Artocarpus incisia, Linn	Antipolo or tipolo	Rubber tree.
Eriodendron anfractuosum, D. C	Bubuy or boboy-cayo	IV.
Maba buxifolia, Pers	Ebano	Superior.
Diplodiscus paniculatus, Turcz	Balobo	III.
Taxotrophis ilicifolia, Vidal	Cuyos-cuyos (in Bicol: Curos-curos)	IV.
Octomeles sumatrana, Miq	Binonang	IV.
Hernandia peltata, Meissn	Colon-cogon or colongcogong	
Calophyllum inophyllum, Linn	Palo maria de la playa or dancalan (in Bicol)	II.
Xilopia blancoi, Vidal	Banitan or lanutan	II.
Eugenia claviflora, Lam	Dilang butigui	IV.
Cordia blancoi, Vidal	Anonang	III.
Vitex littoralis, Dene	Molave	Superior.
Mallotus moluccanus, Muell	Taquit-asin in Tagalog; Alim in Bicol	IV.
Cinnamomum mercadoi, Vidal	Calingay or calingac	II.
Calophyllum spectabile, Willd	Bitoc or bitanhol, or Palo-maria (Del Monte)	III.
Ternstrœmia toquian, Vill	Toquian	IV.
Dolichandrone rheedii, Seeman	Tua, or tuy, or tooc	IV.
Heritiera littoralis, Dryam	Dungon, late	II.
Sonneratia acida, Linn	Pagatpat or palapat	III.
Bruguiera rumpbiv, Blume	Buzain	V.
Alstonia macrophylla, Wall	Batino	II.
Terminalia cattappa, Linn	Talisay	III.
Carappa moluccensis, Lam	Tabigui pulá or tabigui	III.
Cordia subcordata, Linn	Banalo second or sigan dagat	II.
Heritiera sylvatica, Vidal	Dungon	Superior.
Columbia serratifolia, D. C	Anilao	IV.
Morinda bracteata, Roxb	Bancudo or nono	IV.
Thespesia populinea, Corr	Banalo first or boboi-gubat (in Bicol: Malibago)	III
Duabanga moluccana, Blume	Lubtub	IV
Macaranga lanarius, Muell	Binunga	IV
Avicennia officinalis, Linn	Bungalon (Tagalog) or pipisig (Bicol)	V
Aegiceras majus, Gaertn	Tingan baguis (Tagalog) or tapal	V
Sterculia campanulata, Wall	Taloto	IV
Xylopia blancoi, Vidal	Banitan (Tagalog) or tanguisan bayauac	II
Evodia latifolia, D. C	Taligarac	
Azaola betis, Blanco	Betis	I

Altogether 131 species were collected, or 94 in addition to the 37 listed above.

The following table shows the average stand per acre for those species which occur most frequently:

Acre measurement of trees 8 inches and over (102 acres) on the southwest coast of the Camarines.

Species.	Average number of trees per acre.	Average diameter.	Maximum diameter.	Average height of tree.	Average merchantable length.	Amount per acre.
		Inches.	*Inches.*	*Feet.*	*Feet.*	*Cubic feet.*
Alahan	23.16	10	20	48	23	197
Anang	1.58	12	28	66	43	51
Apitong	1.07	20	40	100	70	145
Aranga	.65	15	35	80	43	36
Balobo	15.45	12	28	52	20	240
Bitoc	1.09	11	28	58	22	15
Bolong-eta	.35	16	32	80	49	24
Camagon	.68	13	35	57	31	17
Dungon	1.98	17	40	75	33	103
Ebano	.01	8	20	33	10	.10
Guijo	.87	19	48	73	45	70
Lauan	4.70	27	65	104	63	892
Macaasin	5.39	14	52	69	31	169
Molave	.75	27	63	68	42	88
Total	57.73					
Mean average		15.8	38.1	68.8	37.5	146.2

ROCK.

On the entire tract the prevailing rock is limestone, especially along the seacoast and on the lower slopes of the main watershed. It is also found outcropping on the steep ridges and in the upper portions of the different valleys. Along the ridges and in a few sections where the newer volcanic formations occur crystallanic schists are found, but in no case do they occur over a sufficient area to form an important factor.

On the south slope of Mount Hantic there is a considerable amount of granite, which forms large bowlders on the top of the mountains. Along the coast and on gentle slopes the limestone is found in layers, and on the ridges and in the valleys there are large drifts of limestone rock, which in many instances make it extremely difficult to get at the timber, as the carabao is an extremely tenderfooted animal.

SOIL.

The soil formed from the disintegration of the limestone varies from a sandy clay near the seacoast to a very stiff clay a short distance back from the coast, on the upper slopes, and in fact over the greater extent of the tract. In places where the heavy forest extends down nearly to the coast a small amount of sandy loam or loamy sand has been formed, but on the whole almost all the soil is heavy clay, which is not especially favorable to tree growth, as it is rather difficult for the roots to penetrate deeply into such a soil. For the best development of hard woods it is necessary that the tap roots should descend to a considerable depth. That the soil is favorable to the best root development is shown from the fact that many of the roots extend along the surface of the ground, are thus very easily injured in logging, and the health and soundness of the trees affected. Such heavy clay soils harden and crack very readily when exposed to the full force of the sun, so that extreme care should be taken in lumbering not to form large openings throughout the forest.

One of the worst features of such a stiff, heavy clay is that the total height and clear length of the trees is seriously reduced on account of the inability of the tap root to reach the looser and moister subsoil. Along the lower slopes, however, the soil composition is a more favorable one, containing a greater proportion of sand, and so forms a mixture which should be able to produce the very best kind of timber.

HUMUS.

The leaves decompose very rapidly during the rainy season, but throughout the dry season the ground is covered with a fairly heavy matting of dry leaves, with only a thin layer of humus underneath. This humus is sufficient to allow the seed to germinate, but the young seedlings find it difficult to gain a foothold in the heavy clay soil.

The reason that a certain amount of humus remains undecomposed through the dry season is on account of the large degree of moisture in the soil.

GROUND COVER.

This is usually nothing more than dry leaves, and in places both leaves and humus are lacking, the soil being exposed to the serious drying-out effect of the sun. Within one year the fallen leaves decompose entirely, while in the colder climates they often remain almost entire for three years or more.

No moss covers the ground, but in its place, in openings in the forest, we find grass, herbs, ferns, dwarf varieties of vines, etc., which often mat on the soil and prevent all chances of reproduction.

UNDERBRUSH.

In all places where the stand is not sufficiently dense a great many climbing palms bamboo, and other shrubs come up, frequently forming an impenetrable thicket which seriously retards all reproduction. In low ridges, where the soil and undergrowth are favorable, we often find a considerable amount of young growth, while in the depressions and more open forests the climbing palms of the genus calamus (Spanish, bejuco) prevail in such numbers as to absolutely prevent reproduction.

Although the bejuco is a very important material in the Tropics, it presents to-day, and probably will in the future, the main obstacle to the existence of a desirable young growth.

It does not appear to thrive under dense shade or in the open, but grows most thickly where the forest has been partly thinned out. This fact, together with the growth of grass in the openings, is another strong reason for using extreme care in logging not to form large clearings.

REPRODUCTION.

In some sections where the bejuco has not gained a strong foothold the stand of saplings is quite dense, but the most valuable species rarely predominate. The reason for this is that only the best merchantable species have so far been cut, and consequently they have very little chance of holding their own in the forest, and are being gradually eliminated from the stand.

On the whole, the reproduction of the more valuable species, with the exception of camagon, is very poor. Hundreds of seedlings of this species, and occasionally a fair amount of saplings and pole wood, occur around one seed tree.

Next in the power of reproduction come palo-maria, dungon, and molave. Molave seems to be the only species that requires much light for its development. All other species stand more or less shade, and some, especially camagon, alahan, and balobo, seem to thrive best under dense shade.

In the small openings caused by the removal of single trees the dense growth of bejuco is unfavorable to good reproduction, and the large openings and abandoned "cainius" (small rice fields) are covered with grass.

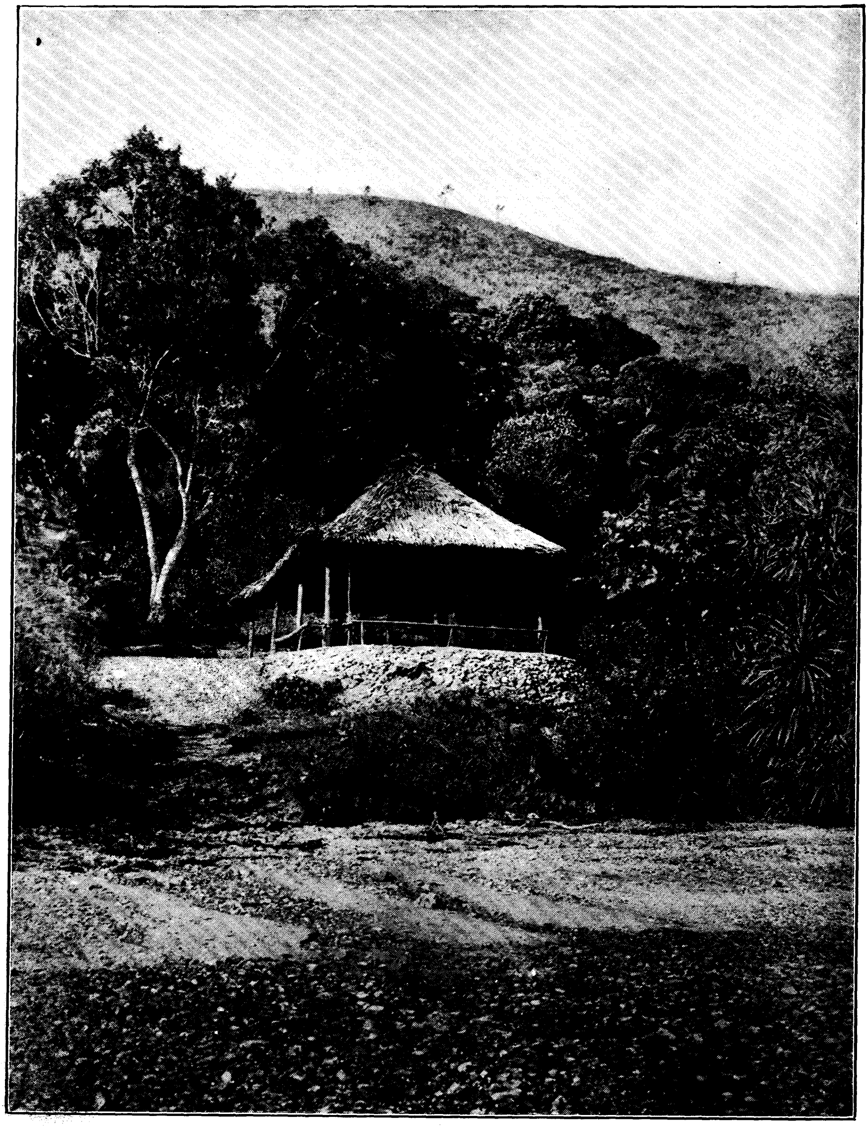
There is, of course, a great difference in the quantity of good seed produced from one tree or from a certain number of flowers, depending on the species, size, age, and position of the tree, and also on the weather and destructive animals. Several inferior species, especially balobo and lauan, have abundant blossoms and probably produce seed every year, while of many other species, such as dungon, dungonlate, molave, camagon, and tucancalao, we only find seed-bearing specimens at certain intervals in the age of the tree. No fruit, flower, or young growth of calantas, ebano, or tindalo could be found, neither seeds nor seedlings of acle.

The heavy seeds and fruits of camagon, tucancalao, dungonlate, apitong, bangcal, dungon, acle, tindalo, betis, dulitan, calantas, ebano, and others have a great disadvantage, both in number and facility of distribution, in comparison with the species of balobo, lauan, guijo, bayug, macaasin, anilan, ligaa, etc.

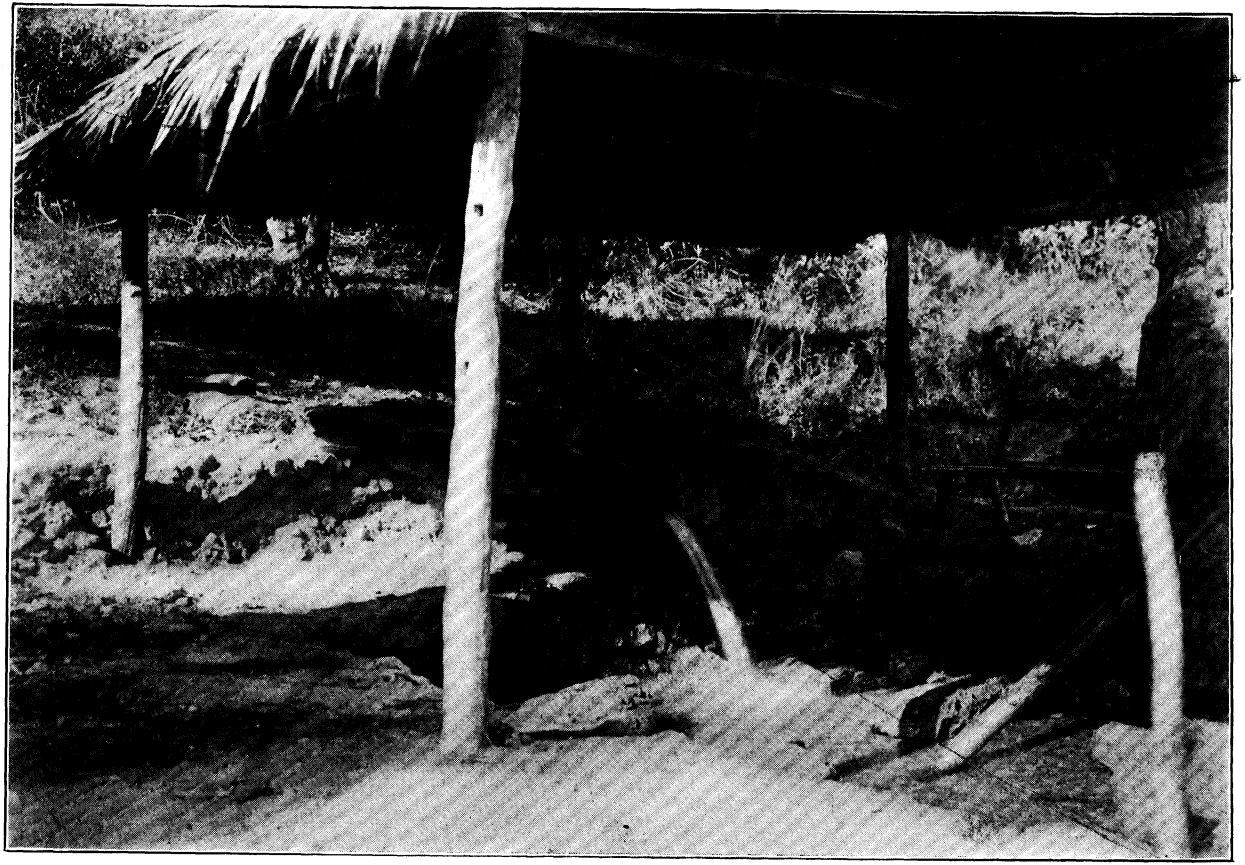
Beyond a doubt the seed of many species either do not find enough soil to protect them from drying out, or the ground is too heavy or hard for their germination. Even when sprouted many seedlings die under the dense bejuco cover or are strangled by this plant, bamboo, and other weeds.

On steep slopes many seeds are washed away by heavy rains. Several varieties of balete have an abundant fruit production, but unfortunately most of them, as climbing species, are much more destructive than useful, as they strangle many of the best trees, particularly molave. On account of the uniformity of the weather throughout the year many tree species have a much more variable season in which to ripen fruits than the trees in colder climates, and in every month of the year we see ripe, fresh fruit of some species.

The majority of the species blossom in March, April, and May, dropping the ripe seeds in July, August, and September. Often a tree will have both flowers and ripe



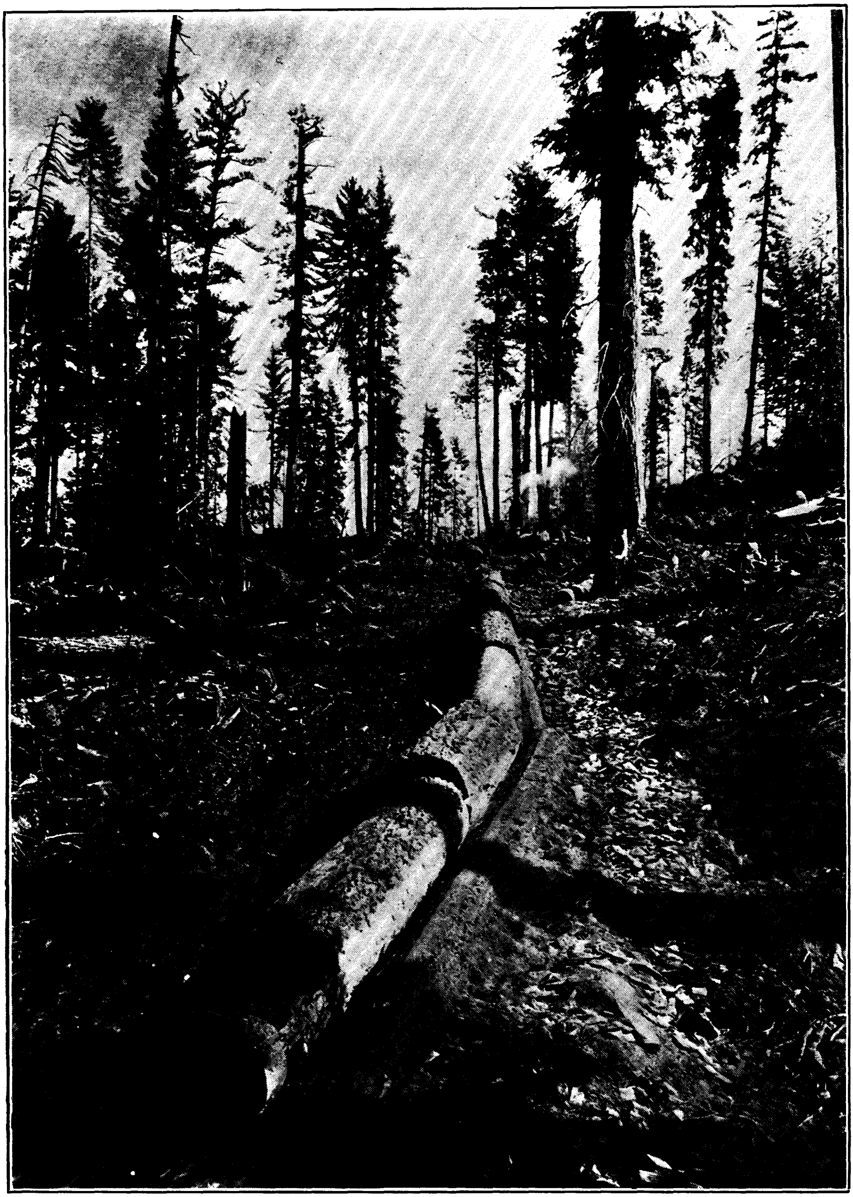
SPRING WHICH SUPPLIES THE TOWN OF CULION WITH WATER—GENERAL VIEW.



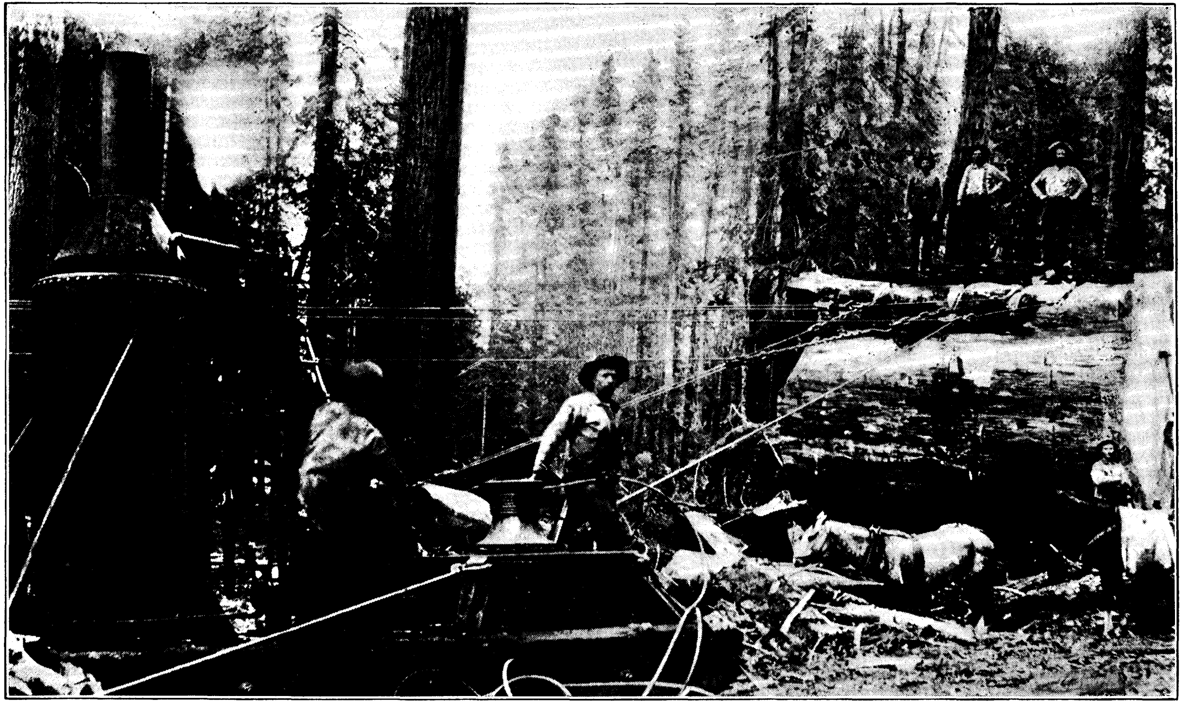
SPRING WHICH SUPPLIES THE TOWN OF CULION WITH WATER—NEAR VIEW.

CANEBRAKE, CULION ISLAND.

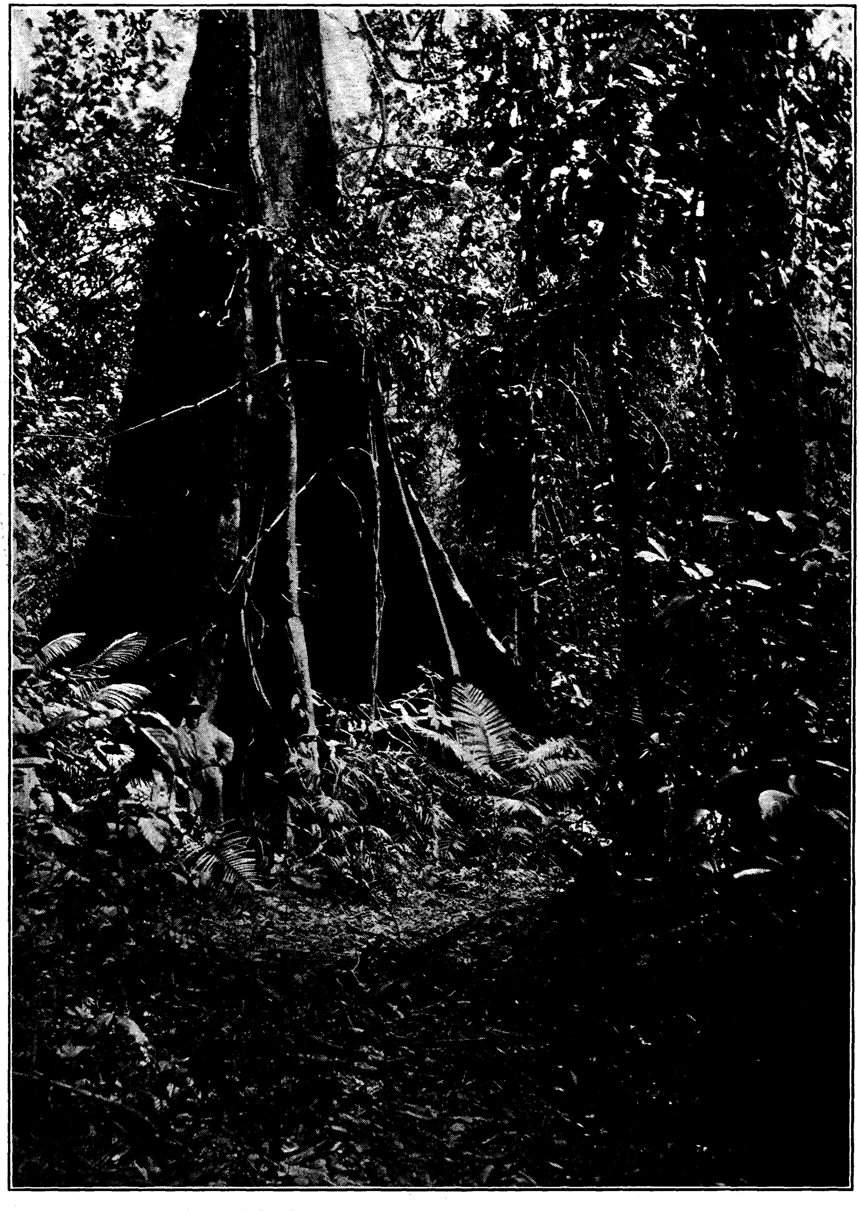
These canebrakes produce bamboo in great abundance for building purposes.



SIERRA FOREST RESERVE, CAL., LOOKING UP A LOG SLIDE TRIBUTARY TO MAIN SLIDE TO MILL.

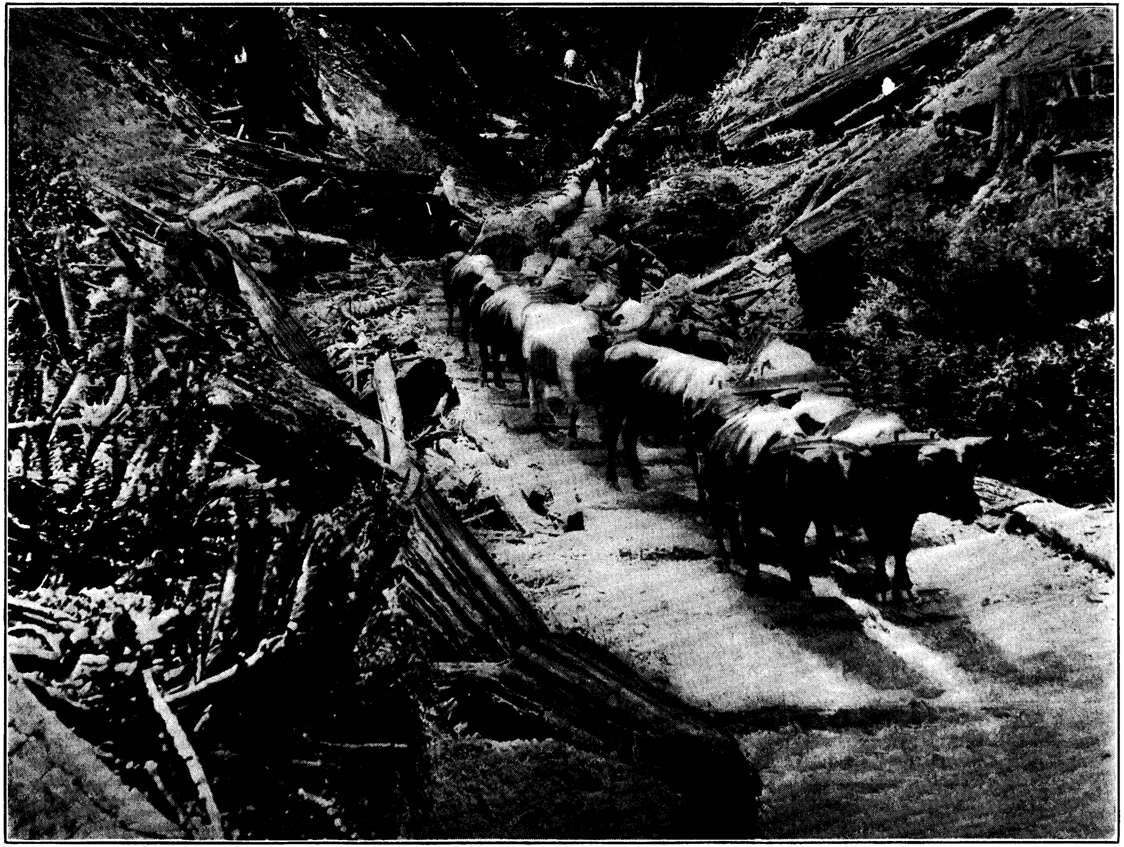


MILLWOOD, FRESNO COUNTY, CAL. ROLLING LARGE REDWOOD LOG WITH "DONKEY" ENGINE.

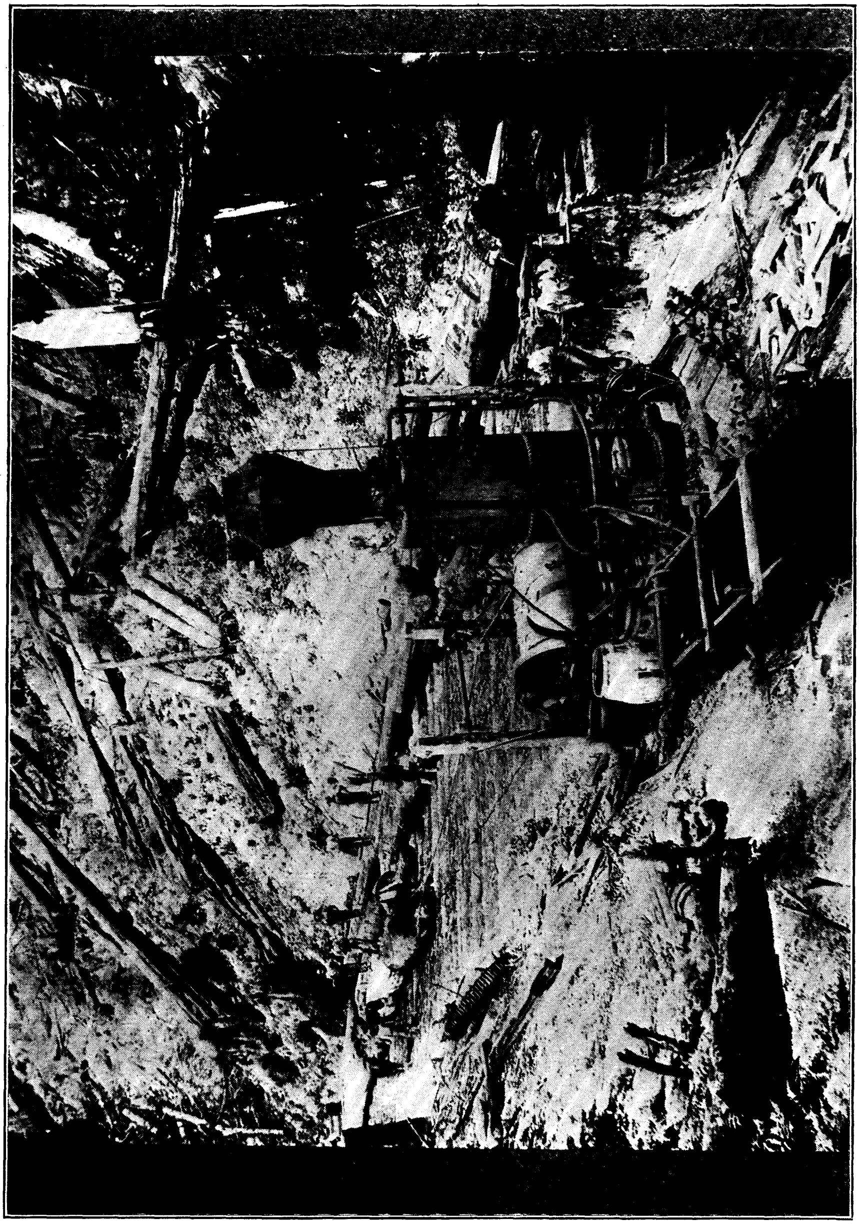


DOA, SHOWING SPREADING CHARACTER OF ROOTS, ALSO CHARACTER OF FOREST UNDERBRUSH.

Attention is invited to picture of American at base of tree, from which an idea of size of tree and its buttresses may be obtained.



BULL TEAM AND TURN OF LOGS, 12,000 FEET, BOARD MEASURE, USAL, CAL.



"BULL DONKEY" AT FORT BRAGG, MENDOCINO COUNTY, CAL.

fruit at the same time, and this occurs in the case of botang and colon-cogon about January, dap-dap about March, and dancalan about April.

As far as is known January seems to be the principal month in which dungonlate, botong, and ligaa ripen; February for balobo; March for dancalan; April for tucancalao and certain species of balete, betis, and toloto; June for calumpit, bubuy, bitbit, pili, dulitan, catmon, catapan, muling-muling, and macaasin; July for alahan, malacatmon, lauan, guijo, and camagon.

DENSITY.

In some sections, particularly near Binahian, on the ridges extending down toward the coast from the main watershed, the stand of timber is comparatively dense. In the valleys and on the top of the highest ridges the timber is rather open, but over by far the greater proportion of the tract the stand is broken.

MERCHANTABLE CONDITION.

This forest area contains a large number of very valuable species, but the merchantable condition of all the timber is rather poor, both on account of the short clear length of the trees and the percentage both of the timber and lumber which is found to be unsound.

The clear or merchantable length of the following species is about one-half the total height of the tree, viz: Calantas, dungon, ebano, batitanan, betis, amuguis, banuyo, guijo. The merchantable length of aranga, bangcal, apitong, lauan, tanguile, and anang is fully two-thirds of the total height, while in tindalo, acle, balobo, malasaquin, alahan, catmon, macaasin, tucancalao, and ligaa the merchantable length is only about two-fifths of the tree, and the proportion in the case of molave, dancalan, balete, botong, and some others is one-third or less. For apparently sound timber about 30 per cent should be discounted on account of unseen defects.

Insects and the white ant attack timber within a short time after it is felled, but they very rarely attack living trees, and do them almost no damage. The worst enemy of the forest is the balete, of which five different species were found on the tract.

The balete starts on a tree as a vine, then sends its long air roots down to the soil, and finally forms an entire envelope around the whole tree. In a comparatively short time the tree rots within its shell and the balete grows into one solid mass.

The natives very often girdle apitong and pili in order to collect the resin, which is burnt in cups and torches to furnish light, but it appears that this practice with the possible exception of checking the rate of growth, does very little damage to the tree, as the wounds heal over very rapidly and the tree is apparently sound.

LUMBERING.

Some hundred years ago a very small amount of cutting was carried on in these forests for local use at Pasacao, as this town was apparently of far greater importance in former years than at the present time. The export of timber from this portion of the Camarines coast to Manila, began about twenty years ago when molave, calantas, dungon, ebano, tindalo, betis, aranga, and mangachapuy composed the main portion of the cargo.

In those days the native lumbermen hauled timber from a much greater distance from the coast than at the present time, when both the amount cut and the length of the haul have been restricted on account of carabao, and also, within the last two years, the danger of ladrones.

The average Government valuation which is paid by the Philippine Lumber and Development Company on all classes of timber amounts to 10 cents per cubic foot.

At present this company have only thirty carabaos hauling timber, while in early years they always employed one hundred or more. The company cuts timber from three main points, viz.: Cotmo, Dalupoan, and Binahian, and as they practically control these three towns, nearly all the natives work for them, receiving the following scale of wages: Choppers and hewers, 70 cents per day, exclusive of board; trail-builders, skidders and drivers, 50 cents per day, exclusive of board; hire of carabao, $1 to $1.50 per day. The price for a fairly good sized carabao ranges from $150 to $200. This high price is on account of the scarcity of the animals, as it is estimated that the rinderpest carried off between 75 and 90 per cent of the carabaos in the province.

The manager of the company hires a number of carabaos, paying $1 per day, and figures the average cost of hauling, from 1 to 3 miles, at 16 cents per cubic foot. However, nearly all the cutting and hauling is done by contract, the natives cutting those trees which offer the least difficulty in hauling, and hence along the seacoast the forest has been stripped of the most important species. The only restriction so far is that the company will not export any logs which are not at least 12 inches square.

Such native logging is naturally very scattering and close supervision has been impossible. When the operations are concentrated into a small area, supervision by the forest officials will become less difficult, and the lumberman will be able to use a wire cable system for hauling out the logs. Skidding with the cable could be very easily adopted in the Caima, Tinalmud, and Caranan valleys. The company has under consideration the establishment of such a system in the Caima Valley, and this would include the timber from the mountains northeast of Binahian, from the west slope of Titus, and from the southwest slope of Hantic.

Under such a system carabaos would skid the logs from the tree to the main valley, which, in nearly all cases, would be a short haul.

In order to lumber successfully, companies operating in the Philippine Islands must be, to a certain extent, independent of carabaos, as these animals are very scarce, delicate in health, and must be taken to water several times a day, and this latter point especially makes their use on high mountain slopes, where some of the best timber is located, practically impossible.

Nearly all the timber which is shipped to Manila is squared in the forest and usually ranges from 12 to 24 inches wide at the top end, and as long as the carabao can conveniently haul.

This system leads to a large percentage of the clear length being left in the woods to rot. However, special efforts are made to get out long lengths of timbers which are used on docks and shipbuilding, such as dungon, tetis, and guijo, which will measure from 49 to 59 feet clear length. Batitinan, mangachapuy, palo-maria (del monte), 19 to 32 feet logs.

Lauan, the principal tree for bancas, is often cut the entire clear length, forming bancas and cascos from 32 to 65 feet long and 24 to 48 inches wide. Lauan, and more especially apitong, furnish planks and boards with a top diameter of 12 inches and from 82 to 98 feet long.

Molave timbers are very seldom over 16 to 32 feet long and 16 to 32 inches square.

Fortunately the crooked, tough, and durable branches of molave and dancalan, down to a diameter of 8 inches, are very valuable in ship construction.

Calantas is used mainly for cigar boxes, and also to a small extent for interior finishing.

Tindalo, acle, and camagon are also used in interior finishing and for furniture, so that short logs of these three species are readily sold in the Manila market.

The best tindalo furnishes clear logs up to 32 feet, acle 19 to 26 feet, calantas 65 feet, and in exceptional cases 98 feet. Tucancalao and calumpit 26 to 39 feet. Lanete is a beautiful yellow straight-grained wood, which is very fine for furniture.

The black-heart wood of ebano, dressed round and ready for the market, is brought in to Dalupoan by the natives in lengths ranging from 6 to 36 feet with a maximum diameter of 10 inches at the bottom and a minimum diameter of 2 inches at the top.

Bitoc and alahan are used for telegraph poles and house posts. Molave is used for beams, flooring, all sorts of construction timbers, railroad ties, doors, windows, etc.

Most of the cordwood (rajas) is cut from swamp trees, principally tangal and bacauan, and to some extent pipisig and pagatpat.

The Philippine Lumber and Development Company make a small amount of charcoal for their own use from guyong-guyong, which is said to be the very best for blacksmithing.

The following timbers are those which are generally used in the construction of native houses: Alahan, anang, bitoc, lauan, apitong, anaho, banga, bonga, and bamboo, while in the better class of houses a considerable amount of guijo and molave is employed.

The few tables, chairs, and benches which are found in the native houses are usually made from guijo, while guyaba brush furnishes the wood for cooking. The resin of apitong and lauan is often used in cups and torches as a fuel, and the soft white resin of biti is used extensively in the manufacture of fine varnishes. The company ships from 500 to 1,000 kegs of resin to Manila each year.

Several other species have an abundant flow of a sticky white juice, which is now being investigated by chemists and will probably be found to contain valuable properties.

Dungon, tooc, and tua are recognized as more or less valuable dyewoods, and the bark of bacanan is said to be good for tanning.

Under the present system of logging, only a small portion of the tree is used, and the natives not only leave the entire top in the woods, but a large part of the merchantable length as well.

The following table gives the approximate amount which is utilized:

	Per cent.
Camagon	15
Ebano	10 to 20
Guijo, aranga	30
Lauan, molave, dancalan	40
Apitong, calantas	50
Dungon and, in general, most other species	25

Of course, in every case all the merchantable length should be utilized, and the wood in most of the tops, which are left in the woods to rot, is suitable for charcoal, box boards, staves, paving blocks, etc.

The natives have never used a crosscut saw in the forests, and with an ax it is a long and hard piece of work to fell the large, very tough Philippine timber.

The Filipino uses a heavy, narrow, single-bitted ax, with a very long handle, both for felling the tree, cutting the logs, and hewing the timber. Finding it slow work, the native who is not overburdened with energy attempts to hasten matters by setting fire to the stump, and when the tree falls he sets fire to the log in order to save himself a certain amount of hewing.

Such a method is of course very primitive and a considerable amount of fine timber is lost through such carelessness. The natives will leave a log burning for such a length of time that it is either badly injured or almost totally destroyed.

The Philippine Lumber and Development Company pays the following prices for sawing the hewed timber into boards by hand at Dalupoan:

	Cuartos.
Dungon and betis, per square foot	4
Molave, dancalan, acle	3
Guijo, mangachapuy	2
Apitong and lauan	1

1 cuarto=1¼ cents Mexican.

The company contract for bancas according to dimensions and the quality of the timber used. A good lauan banca 48 feet long and 3 feet wide, when trimmed out ready for use, but without outriggers is worth about $60.

It will take six carabaos and four men two days to haul a banca of this size 1½ miles from the forest to the shore, at a cost of about $20. At present the Philippine Lumber and Development Company is cutting annually about 100,000 cubic feet, most of which is shipped to Manila.

FOREST MANAGEMENT.

The present scattered lumbering leaves the present forest wealth entirely in the hands of the ignorant cutter, and consequently the most valuable species are seriously handicapped in holding their own.

Careful supervision in the forest by the company and particularly by the government is impossible under the present system.

While the inferior species and weeds have an increased chance for reproduction, the more valuable species are gradually disappearing, especially the light-needing varieties, such as molave, tindalo, and calantas.

When the large timber is slashed down without any regard to the young growth, the first seeding is apt to fail on account of the excessive amount of light in the openings. After the young growth has commenced to come up again, shading the soil to a certain extent, the conditions for reproduction are more favorable. However, later on the more valuable, slow-growing species are in danger of being suppressed and killed by the bejuco vines, bamboo, and the less valuable species.

The entire tops are left in the woods, and cover so much ground that they either check all reproduction or delay it for years to come, until the tops have rotted down.

All trees which are to be cut should be selected and marked with a view to the sylvicultural requirements of the forest, and the cutting should be carried out under the supervision and direction of the government rangers.

The use of fire in felling and hewing should be absolutely forbidden.

PRELIMINARY REPORT ON WORKING PLAN OF BATAAN PROVINCE.

By RALPH C. BRYANT, Forester.

Bataan Province, situated directly across Manila Bay from Manila, is a long peninsula forming the western coast line of Manila Bay and separating it from the China Sea. Its greatest length is about 35 miles, and it varies in width from 15 to 20 miles, with an approximate area of 303,200 acres. The general trend of the province is northerly and southerly.

The configuration in general is mountainous, with two main centers, the one in the southern end of Bataan Province being about 5,000 feet high, and undoubtedly is the crater of an extinct volcano. This system with its foothills covers an area south of a line drawn from Bagac on the west coast to Orion on the east coast, and comprises somewhat more than one-third of the area of the province.

South of Bagac on the west coast the country is divided up into long leading ridges running from the central peak to the coast, with more or less narrow valleys down which flow small rapid streams. On the south and east coasts, the lowlands run back for a distance of 2 miles before they reach an elevation of 300 feet.

The ridges on the south and east coasts are fewer in number than on the west slope and generally do not extend to the coast. On the south eastern side there is a large amount of flat land, mainly covered with brushy growth, which has but little merchantable value. The streams on this side are generally larger than those on the west coast, draining a greater area, but none are suitable for lumbering purposes.

The other mountain system lies in the region north of Bagac, and including its foothills occupies a greater part of the remaining portion of the province, with the exception of a long strip of flat land along the east coast extending from Orion to Dinalupihan, which constitutes the greater portion of the agricultural lands of the province.

There is no accessible timber of any value on the east coast from Balanga to Dinalupihan, except in the gorges where it is very hard to get out. The timber on the ridges and other accessible places has been severely culled for years past, all the towns along the coast being fishing towns, and consequently there is always a large demand for bancas. The main species to be found here are banao, which has not been cut in the past; cupang, inferior; amuguis and guijo of small dimensions. All lauan which will make even the smallest-sized bancas has been taken out.

On the west coast northeast of Bagac is found some of the finest timber in the province, mainly on the long leading ridges extending down from the mountains almost at right angles to the coast. Here there is a fine stand of panao, tanguile, lauan, and cupang, tanguile in general predominating.

Between Bagac and Moron brush land and rice fields extend back from the coast for 2 or 3 miles, but higher up there is a fairly dense forest of tanguile, panao, lauan, cupang, bolong-eta, mareg, and many less valuable species. In the vicinity of Moron the brush lands extend back from the coast for about 3 miles, but from here on to the northern boundary of the province the lower slopes are covered with a fine stand of lauan, which is unusually tall and clean boled. There are also scattered specimens of tanguile, panao, and palo-maria.

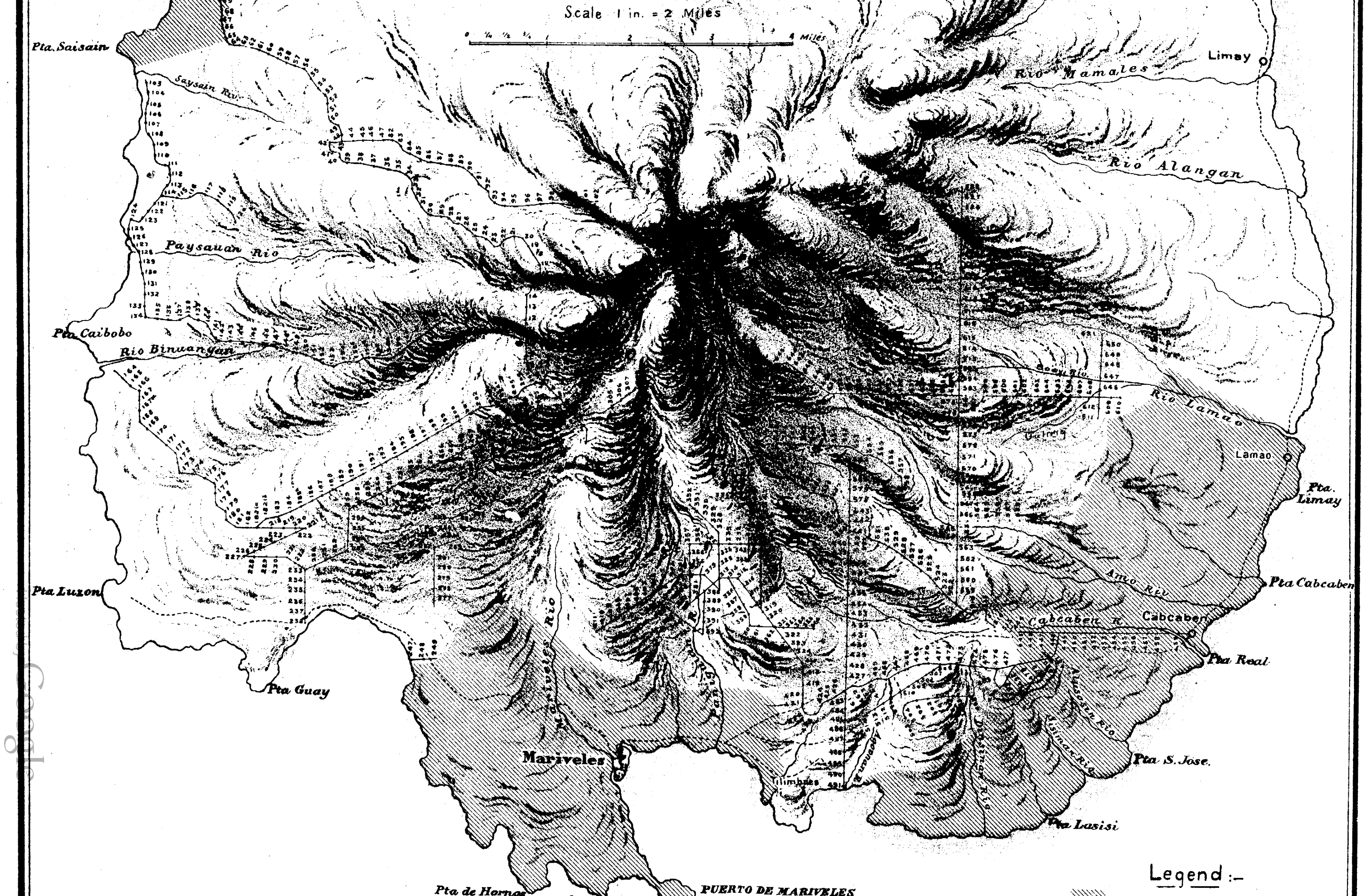
The timber tributary to the Colo River back of Dinalupihan has also been severely culled in the past for banca timber.

Principally lauan and tanguile have been cut here, and much of the timber remaining is inferior both as to species and quality. In the region south of a line drawn from Bagac on the west coast to Lamao on the east coast, an area of approximately 65,900 acres, within what has been set aside as a military reservation, a detailed examination was made of the forest. In this part of the province the family of Dipterocarpeae reach a fine development and constitute the bulk of the merchantable timber. The following are the most important members of the family found here: Tanguile (shorea), lauan (anisoptera), panao (dipterocarpus), palosapis (shorea), guijo (shorea), dalindigan (shorea).

Of these the first four are found in greatest abundance. The soil here is a laterite and seems especially adapted to the development of this family. The greater part of it is a sandy loam—rich, fresh, and deep—formed by the disintegration of the sandstone and the decomposition of the leaves and litter composing the ground cover. Along the lower slopes of the mountains the soil is a deep, loamy sand, easily dried out when exposed to the sun, yet supporting a good tree growth under favorable circumstances. In much of the flat land on the east side the soil tends more to a loamy clay, which when dried out often forms large cracks in the soil and though not of the best for forest growth seems to be adapted to agricultural crops when irrigated.

The work was begun west of Mariveles, a municipality on the south coast of the province. The land near the town is covered mainly with rice fields, and as the low-lying foothills west of these are entered a brush growth commences composed mainly of third and fourth group trees, with an occasional first and second group tree, such as molave, anubing, malaruhat, and palo-maria. All these trees here are short, limby, and of very poor form. This area of brush lands was at one time cov-

MAP OF SOUTHEN PART OF BATAAN PROVINCE, COVERED BY WORKING PLAN, WITHIN THE MILITARY RESERVATION.



ered with a growth of large timber, but repeated encroachments have been made for timber and firewood, causing the boundary of the forest to be gradually pushed back toward the mountains and less accessible places.

The soil has not been able to reclothe itself with large forest growth, due partly to the continuous demands on it for small-sized timber and firewood.

Proceeding northwest from the brush land, the stand of timber increases, the trees becoming larger and better formed, cupang, bolong eta, paho, lanutan, alupag, mabantut, and mabanut comprising the main stand, the diameter being generally 14 inches or under. In this region amuguis, banaba, manicnic, guijo, camayuan, panao, lamio, dalindigan, mayapis, ligaa, malaruhat, malatum baga, and puso-puso are found growing to merchantable dimensions.

Occasional specimens of dungon, tindado, acle, and anubing are also found. The last three, however, are usually of poor form and of little merchantable value. The greater part of timber in this region adjacent to the Bayaan River is more suitable for poles, posts, piles, and sills than for saw timber. The merchantable-timber line is reached in almost all cases at an elevation of 2,000 to 2,200 feet, the timber above this being short-boled and very often defective.

In many cases tanguile in almost pure stands is found at an elevation of 1,500 to 2,200 feet, mainly on the long leading ridges running down to the coast. It is generally the last tree of commercial importance before the merchantable timber line is reached.

Panao in pure stands was found at elevations varying from 1,200 to 1,800 feet, but mainly on the main ridges. Lauan was found, but seldom in pure stands.

In general there were found from 30 to 50 different species per acre above 8 inches in diameter, the greater number of these having a small average diameter of 10 to 15 inches, and boles generally short.

The timber on the west coast is found in greater abundance and of the best form on the long leading ridges running in an easterly and westerly direction from the mountains to the coast; also on the higher slopes of these ridges.

In the valleys near the streams the timber is of an inferior quality both as to form and soundness, tanguile often showing punk knots, and lauan a rot near the butt.

On the dividing ridge between Bayaan and Aglolma rivers a fine stand of tanguile is found at an elevation of 1,900 feet, it being the only merchantable species at this height in the vicinity.

In the upper watershed of the Binouangan River the preponderating species is panao of a fine form. This species is found in best development in this basin between the elevations of 900 and 1,500 feet. Here good tanguile was found above 1,500 feet elevation, and a considerable amount of lauan and guijo below 900 feet elevation, though they are found scattered over the whole area. There is a large amount of lauan here below 20 inches in diameter, which in time will form a good stand of large timber. One of the finest lauan trees seen in this province was found in this basin, having a diameter of 60 inches and a clear length of 120 feet.

One 60-foot banca had been cut out from the tree, two or three years previously, but the banca was not finished and still remains in the forest, though in a bad state of decay, due to the attacks of insects.

The area of this basin is approximately 6,120 acres, all being forest land except a narrow strip directly along the coast, where the timber is small and scattered. This comprises, however, but a small part of the area.

The Binouangan River and its tributaries drains one of the largest basins on the west coast, the topography being hilly in all places except a strip extending east from the coast along the stream for about half a mile. The character of the country is such that lumbering operations can be easily carried on here, the timber coming off the secondary ridges, toward the base of the mountains, and then down the valley of the stream for three-fourths of a mile to the coast. The distance from the coast to the most remote timber in this basin is about 6 miles, all of which, however, can find an easy outlet. The principal species here, as on the eastern coast, are panao, tanguile, lauan, guijo, palosapis, cupang, and some amuguis.

There is also a small amount of cahoy-buur at the higher elevations, but this is generally of very poor form and little value, though some of the trees will yield one log. The various species in this basin do not have the same distribution as to altitude, cupang and amuguis covering only the lower elevations up to 900 feet, an area of approximately 3,900 acres. Panao, lauan, guijo, and palosapis are distributed over the whole area; tanguile, however, is found only on the highest slopes, and covers an approximate area of 2,950 acres. The following table will serve to show the approximate area in acres covered by each of the seven important species, the amount in cubic feet that it will yield within this area, and the total stand for each species within the basin:

Species.	Acres.	Amount per acre.	Total stand.
		Cubic feet.	***Cubic feet.***
Panao	6,120	1,880	11,505,600
Tanguile	2,950	1,760	4,792,000
Guijo	6,120	368	2,252,160
Cupang	3,160	592	1,870,720
Lauan	6,120	258	1,578,960
Palosapis	6,120	170	1,040,400
Amuguis	3,160	93	293,880
Total	33,750	5,121	23,333,720

The above figures represent the merchantable stand within this river basin 20 inches and over in diameter, after making the following deduction for unsound timber:

	Per cent.
Tanguile	30
Amuguis	40
Lauan	30
Guijo	20
Panao	15
Palosapis	15
Cupang	10
Average	22.8

Other species 20 inches and over in diameter suitable for lumber are very scattering, and will yield but a small amount of material suitable for telephone and telegraph poles or piles unless the better species are cut below 20 inches, which is not advisable at the present time.

The above figures show an average stand per acre for the whole basin of 5,121 cubic feet round timber for all species mentioned, though on the lower slopes the stand will be somewhat smaller, and in the higher elevations, larger than the average.

In the drainage basin of the Paysun River the principal species is panao, with an occasional stand of tanguile and lauan, a small amount of guijo, and the usual number of small inferior species.

At an elevation of 1,960 feet, on a gentle southerly slope, was found the heaviest stand of tanguile in the province. It was an almost pure stand, the few additional species represented here having crooked boles and large overdeveloped crowns.

The reproduction of tanguile here was very good between the diameters of 1 to 3 inches, but the reproduction of seedlings was rather poor. The trees have large spreading crowns with a clear length of 40 to 60 feet, and a comparatively small taper; the trees were generally quite sound.

In the basin of the Talin River, a small stream having its headwaters but a short distance back in the mountains, the stand is rather small and the trees have in general a short bole and are more inclined to be defective than those at higher elevations. The more important species found here are cupang, some panao, lauan, amuguis, apitong, and antipolo, together with numerous other species, of which but one or two are found on an acre. The timber in this basin is, on the whole, more suitable for poles, piles, posts, and small-sized timbers, though some of the larger trees will yield a fair amount of saw timber.

The timber along the coast back to an elevation of 400 to 500 feet is generally shorter boled and more defective than at the higher elevations. The trees also have a very large crown development. The density of the stand is "broken to open." A large amount of cupang is found here, with some scattered panao, and considerable inferior lauan, the latter often being defective at the butt. The remaining species of importance found here are batitinan, palosapis, guijo, amuguis, palo-maria, anubing, camayuan, and antipolo. A considerable amount of short saw timber and a large number of medium-length poles can be secured here. This timber being near the coast has some advantages, but a company operating here would probably prefer to go farther back in order to secure greater lengths and sounder timber.

From the Saysaen River to Bagac the density of the forest is open and the quality of the stand in form, figure, and species is poor. In many places no merchantable timber is found, and in general but little timber suitable for poles, posts, and piles. Near Bagac the large timber has been cut out for some distance and the forest is kept in poor shape by the repeated cullings made by the natives for small timber and firewood.

Rice fields extend from the town for five-eighths of a mile south 20 degrees east, the majority of these being under cultivation at the present time. For the next five-eighths of a mile on the same course the timber has been heavily culled, and fields are scattered here and there throughout the brush land.

The following table shows the average stand per acre of the most important species on the west coast (average number of trees per acre, 8 inches and over in diameter, average diameter, maximum diameter, and average merchantable length of the eight important species).

Acre measurements on the west coast.

Species.	Average number of trees per acre.	Average diameter.	Maximum diameter.	Average merchantable length.
		Inches.	*Inches.*	*Feet.*
Panao	9.25	20.43	57	66
Tanguile	4.19	22.11	72	56
Lauan	5.96	16.62	65	65.2
Palosapis	.96	19.42	56	63.8
Guijo	2.44	18.70	64	65.1
Cupang	2.62	24.17	72	54.5
Amuguis	.58	21.68	60	47.7
Palo-maria	.95	12.06	32	38.6
Panganan	2.01	13.08	30	....
Dalindigan	1.21	11.87	42	....
Camayuan	1.57	10.45	40	....
Malaruhat	2.10	14.35	44	....
Putian	2.76	12.29	54	....
Boc-boc	4.18	9.92	22	....
Alupag	3.94	14.45	52	....
Bolong-eta	4.11	10.37	27	....
Dalinas	.44	9.76	17	....
Cato	1.20	11.24	35	....
Calivas	1.28	11.26	22	....
Malacamanga	.88	10.09	25	....
Total mean average	52.63	14.71	44.4	37.1

From this it will be seen that panao is the predominating species, and also has the greatest merchantable length. Lauan comes second in abundance, though the average diameter is considerably lower than panao, the average merchantable length being very nearly the same.

Tanguile is third in number, but shows the largest average diameter of any species. Boc-boc is fourth in number, bolong-eta fifth, and alupag sixth. The last three have, however, an average diameter of 9 to 14 inches. The same order is also found on the eastern coast, except that alupag is fifth and bolong-eta sixth instead of vice versa. For a distance of 2 miles, north of the town of Mariveles, toward the headwaters of the Lalinbin and Mariveles rivers there is no timber of value, the first mile being taken up mainly by fields and rice paddies, the next mile being mainly brush land. In the next three-fourths of a mile there is some small timber but the valuable accessible timber has been taken out.

The general configuration of the country around the headwaters of the Lalinbin and Mariveles rivers is very rough, being cut up into sharp ridges with very steep slopes generally extending to the stream uninterrupted, and often so steep as to be almost impassable.

Panao forms the bulk of the merchantable timber here, but the clear length, except in favored spots, is generally not over 40 to 50 feet, and the boles are inclined to be more defective than usual. There is a small amount of lauan, but it is largely of poor form and defective. Guijo and tanguile are short, but quite sound. The remaining species are generally of very poor form and of little value.

Owing to the very steep slopes no animals could be used here, and the quality and amount of timber is such that a lumber company would not care to put in a cable system so long as there is better and more accessible timber in other parts of the province.

Great care should be exercised in opening up the forest, reproduction being rather poor on the greater part of the area, and the danger from erosion great.

The soil is a shallow, fresh, sandy loam, and, containing many small and some larger bowlders, it washes very easily during the heavy rains. No lumbering should go on here except under strict supervision.

Toward the headwaters of the Mariveles River there are two waterfalls—the upper one about 80 feet high and the lower one 30 feet high. The banks of the river are very steep, and the upper fall is almost inaccessible, the only passage being up the river bed and over the lower fall. The banks of the river rise almost vertically in places to a height of 200 to 400 feet, and there is not sufficient water passing over the falls in the dry season to be of any service as a power.

In the region drained by the Batirrol River and its tributaries northeast of Mariveles, panao is the predominating species, with also a large amount of tanguile and lauan. The panao and the tanguile are usually sound, but the lauan is often defective. On the lower levels there is also a small amount of cupang and guijo, with a large number of inferior species intermixed.

The timber in this region can find an easy outlet down the long leading ridge separating the Cabcaben and the Batirrol River basins. This ridge, joining with the lowlands in the vicinity of Cabcaben, affords an excellent opportunity for the construction of a tramroad from some point along the coast, or from Cabcaben, into the heart of the timber belt. This, in connection with a wire-cable system, would afford an easy and comparatively cheap method of getting out this timber.

The track for such a tramroad could be laid cheaply, as there would be but little grading to be done, and the large amount of timber tributary to such a road would certainly warrant the construction of such a system.

In the flat lands lying south of the trail between Mariveles and Cabcaben, about 3 miles west of Cabcaben, there is a very good stand of amuguis and guijo. The amuguis trees are inclined to be defective at the butt, and, as a general rule, the sound trees will only yield two logs. The reproduction of these two species is poor, especially that of amuguis. Reproduction of amuguis in the pole stage seems to be almost totally lacking here in the forest, though on the edge of the brush lands, where there is considerable light, the conditions are somewhat better. The timber here is quite accessible, and can be easily taken out on the tramroad mentioned previously.

CABCABEN RIVER BASIN.

In the Cabcaben drainage basin the important species are panao, tanguile, lauans guijo, palosapis, cupang, and amuguis. The form figure of all is much the same a, in the other drainage basins, though tanguile as a whole is more inclined to be defective, especially at the higher elevations, than on the western coast. In this region guijo and palosapis reach a fine form and development, and will furnish a large amount of excellent saw timber.

The development of all the above species is very good, with the exception of amuguis.

The brush lands in this region extend back from the coast for a distance of 2 miles or more, and within this area there are no trees of merchantable value. In spots there is a good seedling reproduction of panao, lauan, guijo, cupang, and palo-maria.

The best timber in this region is along the ridges and part way down the slopes, the timber in the valley being generally shorter and more inclined to be defective, This basin could be easily lumbered by means of a cable system, the timber around the headwaters going down the ridge between the Batirrol and the Cabcaben rivers, the timber on the lower slopes finding an outlet down the ridge just north of the Cabcaben River.

AMO RIVER BASIN.

The region drained by the Amo River and tributaries lying west of the barrio of Cabcaben consists approximately of 4,890 acres, of which 3,220 acres are forest land situated near the headwaters of the river and 1,570 acres of brush land lying adjacent to the coast. Within the forest area the river consists of two main branches, both having their source near the base of Bataan Mountain and divided by a low ridge.

From the mouth of the Amo River just north of the barrio of Cabcaben the brush lands extend along the stream in a westerly direction for 2½ miles, the elevation at the end of the brush lands being about 350 feet.

From the edge of the brush lands to the end of the merchantable timber line the distance is 3¼ miles, making the distance from the coast to the most remote timber 5¾ to 6 miles. There are but few large bowlders and but little rough ground in this basin, thus affording a good logging bottom.

There is a considerable amount of large timber which it will be impossible to take out by means of animals owing to its size and weight, and in order to secure this timber some wire-cable system should be used taking the timber down the ridges on either side of the stream.

Timber could be driven down the stream only with difficulty, and even were it feasible a considerable amount of the timber is too heavy to float and could not be taken out in this way.

Within this basin the 7 species found in greatest abundance and of the greatest commercial value are panao, tanguile, palosapis, lauan, cupang, guijo, and amaguis.

In addition to these there are a large number of species of small diameter, which at present have but little value in the market.

The approximate stand of timber in this basin is given below, and will serve to show the approximate stand to be found on the eastern coast in the river basins where the conditions are similar.

The eight species noted previously were used as a basis for determining the stand, the remaining species of large size being scattered and but few in number.

Only trees 20 inches and over in diameter were taken into consideration here, as in the great majority of cases it is not deemed advisable to cut below this diameter limit, mainly on account of silvicultural reasons. Many of the species which attain a large size do not bear fruit abundantly below a diameter of 18 to 20 inches, and in order to insure the presence of a sufficient number of seed trees it will be necessary to set a diameter limit which is not below this. Cutting down to 20 inches will yield an amount of timber sufficient to make the exploitation profitable, and still leave the forest in a condition in which it can recover rapidly.

In determining the stand of timber after computing the volume of the different species it was found necessary to make a reduction varying with the different species for unseen defects and poor timber. This was greatest in the case of tanguile and amuguis, and least in cupang.

The following percentages were deducted for defects from the species named below:

	Per cent.
Tanguile	40
Amuguis	40
Lauan	30
Guijo	20
Panao	15
Palosapis	15
Cupang	10
Average	24.5

The average stand per acre within the forest area for trees 20 inches and over in diameter is as follows:

Species.	Contents.	Per cent of stand.
	Cu. feet.	
Panao	1,448.4	34
Tanguile	937.2	22
Palosapis	724.2	17
Lauan	596.4	14
Cupang	255.6	6
Guijo	213.0	5
Amuguis	85.2	2
Total	4,260	100

The above represents the stand after the deduction of unsound timber, and shows an average of 4,260 cubic feet round timber per acre, with a total volume for the 3,320 acres of 14,143,200 cubic feet. In addition to this there will be an average of 100 cubic feet per acre of other merchantable species, composed of many kinds, and but a small amount of each kind, bringing the total up to 4,360 cubic feet per acre, making the total for the basin 14,475,200 cubic feet.

Panao forms one-third of the stand in this basin, and will furnish long lengths of straight, sound timber. At the present time no panao has been cut in the southern part of the province, the natives claiming that the timber is hard to cut, and, being heavy, is difficult to haul out.

In the upper part of the province and in Zambales Province panao is cut and shipped to Manila, finding a ready market, and undoubtedly the disfavor into which panao has fallen in the south end of the province is due largely to prejudice.

Tanguile forms about one-third of the stand, and though not generally furnishing quite as long lengths as panao, yet on an average yields timber of somewhat larger diameters.

Palosapis forms about one-sixth of the stand, and is of fine form and generally sound.

Lauan forms about one-seventh of the stand, and though there are many more stems per acre than of palosapis, the average diameter is not as large and the timber is more defective.

Cupang, guijo, and amuguis form but a small part of the stand, and are found only on the lower elevations. The amuguis is in general very defective.

This region will yield in telegraph poles an average of 1.4 poles per acre of bolong-eta between the diameters of 10 and 20 inches (mainly between 10 and 14 inches); an average of 0.6 poles per acre for amayuan between 10 inches and 18 inches diameter; an average of 1 pole per acre of boc-boc between 10 and 17 inches diameter; an average of 1.8 poles per acre of alupag between 10 and 20 inches diameter (mainly between 10 and 15 inches); an average of 2.2 poles of palo-maria per acre between 10 and 20 inches in diameter (mainly between 10 and 16 inches). These poles have an average length of 35 to 40 feet, and in most cases are straight and sound. The following table shows the average stand of poles per acre and also for the tract:

Species.	Number of trees.	Total number of trees.
	Per acre.	
Camayuan	0.6	1,680
Boc-boc	1.0	2,800
Bolong-eta	1.4	3,920
Alupag	1.8	5,040
Palo-maria	2.2	6,160
Total	7.0	19,600

At the present time it will not be advisable to remove a large number of palo-maria, if it is desired to continue this species in the forest. None should be taken out except under direction of some forest official.

LAMAO RIVER BASIN.

The chief species in this basin are panao, lauan, and tanguile, the two former predominating. There is also a considerable amount of camayuan, palo-maria, and bolong-eta, with a fair stand of guijo, cupang, and amuguis.

The silvicultural conditions here vary but little from the other river basins, with the exception of tanguile, which here reaches a greater average height and clear length than is found on the west coast.

This region can be easily lumbered by means of a wire cable system, the ascent toward the mountains being easier and the country less broken by ridges than on the west coast. The main outlet for the timber in this basin is down the valley of the Lamao River, which enters the sea near Lamao.

The following table shows the average stand per acre of the most important species on the eastern coast, computed from 307 valuation surveys showing the average number of trees per acre, 8 inches and over in diameter, average diameter, maximum diameter, and average merchantable length:

[Acre measurement (307 acres) on east coast.]

Species.	Average number of trees per acre.	Average diameter.	Maximum diameter.	Average merchantable length.
		Inches.	*Inches.*	*Feet.*
Panao	10.20	20.04	59	66
Tanguile	5.45	22.70	64	56
Lauan	6.30	17.86	51	65.2
Palosapis	2.03	22.29	66	63.8
Guijo	2.81	19.02	71	65.1
Cupang	.63	33.30	60	54.5
Amuguis	.54	24.17	51	47.7
Palo-maria	2.83	11.57	38	38.6
Panganan	1.67	13.96	36	....
Dalindigan	1.34	12.26	33	....
Camayuan	2.15	10.89	34	....
Malaruhat	2.15	13.81	47	....
Putian	1.16	14.36	47	....
Boc-boc	4.14	10.32	26	....
Alupag	3.51	13.65	51	....
Bolong-eta	3.32	10.49	33	....
Dalinas	.77	9.87	23	....
Cato	1.04	11.55	31	....
Calivas	2.04	10.67	40	....
Malacamanga	1.70	9.88	33	....
Total	55.78	....	....	....
Mean average	....	15.63	44.65	57.1

GROUND COVER.

The ground cover over the whole region consists principally of leaves, varying in depth from one-half to three inches, with occasional ferns and some grass. In all places there is a marked absence of any form of herbaceous growth, due, to a considerable extent, to the absence of humus.

UNDERBRUSH.

The most common form found in this region are the several kinds of bejuco, which thrive best under a moderate shade, thinning out to a great extent as the forest becomes dense. It is almost entirely absent in the brush lands and in other places where the stand is open. It has, however, a wide range of distribution, and has been found at an elevation of 3,000 feet, though of a dwarf, scrubby form.

Timac comes next in importance, and in open places forms an almost impenetrable thicket. It is found in greatest abundance on the low-lying lands, and evidently needs a large amount of light, being absent in all cases where the forest cover is dense. It is a greater hindrance to reproduction than bejuco, owing to the dense thickets which it forms in open spots where the forest has been opened up. However, in places where seedlings have obtained a start before the timac they apparently are able to live, though their growth is retarded to quite an extent.

REPRODUCTION.

The reproduction in general is as satisfactory as can be expected in a mixed virgin forest, where there are many large trees with broad-spreading and more or less dense crowns, which shade the ground to quite an extent, tending to retard the growth of small seedlings by shutting out a large amount of light. But little difference is found in the reproduction on the east and west coasts.

The reproduction of the three most abundant species—panao, tanguile, and lauan—is good, though it can be considerably improved by a judicious opening up of the forest, and the removal of the large-crowned, mature, and overmature timber. The larger part of the species found in this province are heavy-seeded trees, and are not able to seed much territory except close to the parent tree.

Of the three most important species lauan has the lightest seeds, but they generally do not cover a territory more than 200 feet from the parent tree. It bears fruit only on alternate years.

Panao has a very heavy two-winged seed, which falls directly to the ground. It bears a large number of seeds and germinates readily, the small seedlings being able to endure a considerable amount of shade.

Tanguile fruit was not seen during the work, but the tree bears an abundance of flowers, and reproduction in the region of the parent tree is generally good.

Guijo is also a heavy-seeded tree, and produces a large number of flowers and fruit. The reproduction of this species on the lower slopes, where the density of the forest is "broken to open," is generally good.

Palosapis is a demander of more light than many species, and germinates readily only in more or less open places. The best reproduction of this species was found in the brush lands along the eastern coast, especially in the valleys of the Cabcaben and Amo rivers. The seed is quite light and capable of being borne some distance by the wind. The principal enemy of the fruit is the wild hog. It bears seed every year.

Amuguis is found in considerable abundance on the lower elevations of the eastern coast. It has a heavy, fleshy fruit, and bears abundantly every year. It evidently demands a large amount of light for development, and reproduces well only on the edge of the brush lands. Reproduction within the forest is almost entirely lacking. A considerable amount of fruit is destroyed every year by hogs, monkeys, deer, birds, and the natives—all being very fond of the fruit.

Cupang is also a demander of considerable light. It bears fruit abundantly every year, the fruit being a pod about one foot long and containing large, heavy, dark-colored beans. It apparently germinates easily during the rainy season along the trails in a fairly dense forest, but dies after germination, probably for want of suitable light conditions, as very few seedlings or saplings of any size can be found in such places. Cupang and amuguis are generally found associated together, both seeming to demand the same condition as to soil, light, and elevation. They seldom go above 900 feet elevation, and the only good reproduction noted was on the edge of open places or in open places themselves.

Palo-maria reproduction is generally good, the seed being able to germinate and the seedlings to develop under fairly dense light conditions. The fruit is rather small and heavy and can not be distributed far from the parent tree. It bears fruit every year at a diameter of 10 to 12 inches.

Boc-boc reproduces very well under a medium shade. It bears an abundance of seed every year at a diameter of 6 inches and over.

Bolong-eta reproduces well in the forest and under almost all conditions as to elevation and aspect within the merchantable timber line. The fruit is heavy, abundant, and is borne every year. The tree bears at a diameter of 6 inches and over.

Alupag reproduces fairly well under medium shade. A large amount of fruit is borne every year at a diameter of 5 inches and over.

Camayuan reproduces fairly well, and bears only on alternate years. The first is heavy and borne at a diameter of 6 inches and over. The greater part of the important species bear seed only at comparatively large diameters—from 16 to 20 inches—and are thus handicapped by the great number of less important species, which seldom reach a diameter of 15 to 18 inches and bear seed at a diameter of 6 inches and over.

In order to encourage the more important species it will be advisable to remove as many of the larger trees of the inferior species during the lumbering operations as is possible, without opening up the stand too much. This would remove a large number of seed trees of undesirable species which at the present time offer strong competition to the leading species.

The inferior species are generally more prolific seed bearers than the others, and this, taken with the low diameter at which they bear seed, gives them a decided advantage over the better species.

In opening up the forest during lumbering operations great care must be exercised that no large blanks are made where the sun can reach the soil directly. There being but little ground cover, the soil in exposed places, especially during the dry season, dries out very rapidly, and large cracks are formed in the soil, the conditions being such that young seedlings will be unable to survive.

DENSITY.

Taking the number of stems per acre as a basis, the stand in the province may be considered as "broken," though in many places the soil is heavily shaded by the very large spreading crowns of the trees, which by interlacing form a dense canopy. Where there are heavy stands of panao and tanguile the density is frequently dense, and in some places, especially in panao "groves," the soil is entirely devoid of any brushy growth. This occurs most frequently at an elevation of 1,200 to 1,500 feet.

QUALITY OF LOCATION.

The quality of the whole region for tree growth may be considered No. 1, except along the seacoast, on the very steep slopes, where the soil is thin, and near the end of the merchantable timber line.

In the main forest regions the soil is very favorable for forest growth and, with some assistance, heavier stands can be produced in many places than are found at the present time.

SILVICULTURAL CONDITIONS.

The silvicultural conditions of the species, which grow to a merchantable size, is very good, showing in general a long, clear length and straight boles.

PANAO (DIPTEROCARPUS).

Panao has the best form of any species found in this region of the province. The clear bole ranges from 60 to 90 feet, and clear boles up to 120 feet have been found, though these are the exception. The boles are uniformly straight and clean and the trees in most cases apparently sound.

The large trees are to a great extent dominant, which permits the development of a large crown. The crowns, however, are usually quite symmetrical, and, being above the other trees, allow considerable light to reach the trees in the lower story. When, however, there is a heavy stand of panao poles the ground is generally densely shaded and but little undergrowth is found. The average diameter, calipering all trees down to 8 inches, is 20 inches.

TANGUILE (SHOREA).

Tanguile generally has a shorter bole than panao, running from 40 to 60 feet, fairly cylindrical, and with a small taper. It reaches its best development in height growth in the basins of the Amo and Lamao rivers, on the eastern slope. The average clear length bole here is from 50 to 70 feet, and clear boles to the length of 115 feet, with a total height of 180 feet, were recorded.

The crown of the tanguile is heavy limbed and very irregular, with a small leaf which does not offer as much shade as the larger leaved panao. The average diameter, calipering all trees down to 8 inches, is 22 inches.

LAUAN (ANISOPTERA).

Lauan has not as great a length of clear bole nor as great a height growth as panao. The crown is quite symmetrical and extends a considerable distance down the trunk. The foliage is rather dense on many crowns, but does not generally offer as much shade as panao. The average clear length bole on the west coast is from 50 to 65 feet, but on the east coast, in the region around the Cabcaben, Amo, and Lamao rivers, the clear length will average from 50 to 95 feet. The average diameter, calipering all trees down to 8 inches, is 17 inches.

GUIJO (SHOREA).

The heaviest stand of guijo is found on the lower elevations on the eastern coast, where it forms an important part of the forest.

Guijo resembles tanguile in the character of the bole and general appearance, though the crown is not as heavy limbed and is more regular. The length of clear bole ranges between 50 and 80 feet, with an average diameter of 19 inches, calipering all trees down to 8 inches.

PALOSAPIS (SHOREA).

This is found in greatest abundance and best development on the eastern coast. It has a long, straight, clear bole with a small taper. The crown is usually large, spreading, and the foliage somewhat dense. The clear length ranges between 50 and 80 feet, and has an average diameter, calipering all trees down to the diameter of 8 inches, of 20.8 inches.

AMUGUIS (SHOREA).

Amuguis is found in considerable abundance on the lower elevations of the eastern coast, rarely above 900 feet elevation. The clear bole ranges from 45 to 60 feet in length, with a small taper, generally spreading roots, extending 3 or 4 feet above the ground. The crowns usually spread widely at the end of the clear length, and are large limbed, with a rather thin foliage. It is found in greatest abundance, associated with cupang, on gentle to moderate slopes at an elevation of from 400 to 500 feet. The average diameter, calipering all trees above 8 inches, is 23 inches.

CUPANG (PARKIA).

Cupang has a rather large diameter, with a smooth, straight, cylindrical bole, which is often quite short. The clear length of the bole ranges from 40 to 55 feet, and at the end of this the crown spreads out in many cases very broadly, and is large limbed. The foliage is thin and offers but little shade to the surrounding growth. The cupang has very broad buttressed roots, which in some cases extend as high as 8 to 10 feet above the ground, but generally not over 3 to 5 feet.

On the edge of clearings and in open spaces the cupang produces a very short bole and a crown 80 to 90 feet in diameter, forming a low tree of little value as timber. The average diameter, calipering all trees down to 8 inches, is 24 inches on the west coast and 33 inches on the east coast.

DUNGON (HERITIERA).

Dungon is very scattered and the reproduction is poor, due partly to the light conditions and the comparatively small amount of seed which it bears. It has a straight, clean bole, with a clear length of 50 to 70 feet. The crown is large, spreading, and fairly dense. Its range extends over all aspects and elevations within the merchantable timber belt.

BOLONG-ETA (DIOSPYROS).

This tree is found widely distributed over the whole territory and at all elevations up to 2,000 feet. The boles are fairly straight, but rather rough, and the sapwood is frequently more or less defective. It averages in clear length from 30 to 50 feet.

The crowns are large, regular, and generally fairly dense. The average diameter, calipering all trees down to 8 inches, is 10 inches. It is suitable for posts and small poles, and in Bataan is frequently used as fuel in burning out bancas and to a limited extent as house posts.

ALUPAG (NEPHELIUM).

Generally distributed over the whole area up to 1,900 feet elevation. The boles are usually rather crooked, with a large and irregular crown, and a total height under 100 feet. The length of the clear bole is usually from 30 to 50 feet; the average diameter, calipering all trees down to 8 inches, is 14 inches. Used principally for house posts in Bataan.

BOC-BOC (STREBLUS).

Widely distributed over the whole region. Boles are fairly straight, with a clear length of 30 to 50 feet. The crown is usually large, and very thin. The average diameter, calipering down to 8 inches, is 10 inches. Not used in Bataan at the present time, but should make good posts and poles if treated with creosote or some other preservative.

RATE OF GROWTH.

Here, as in all tropical forests, the greatest difficulty has been found in determining the annual rate of growth of the various species. Owing to there being no abrupt cessation of tree growth, as is found in temperate climates, there is no marked distinction of annual growth rings. Rings are present in numerous cases, but it is undoubtedly true that more than one ring is formed in a year, depending upon the habits of the individual species and also upon the local moisture conditions.

Until much more data are at hand than we have at the present time it will be impossible to deal with the question of the rate of growth.

MERCHANTABLE CONDITION.

The merchantable condition varies considerably with the changes in situation and elevation, but as far as the important species are concerned it is very good.

Panao furnishes long log lengths, which are straight and sound. Tanguile is affected to some extent by fungous diseases, especially in the region of the Cabcaben River, yet almost all trees will yield some saw timber.

Lauan is often affected by a butt rot, but will generally furnish some good logs. The boles are long, straight, and smooth.

Guijo is affected to some extent by fungi, but not to as great an extent as tanguile. Guijo will furnish some very fine saw timber of long lengths.

Palosapis is apparently very sound, and gives long, clear, straight log lengths of large diameters.

Amuguis, found in greatest abundance in low lands, is often defective, but will usually furnish at least one log.

Cupang is generally very sound, and will furnish a large amount of material suitable for boxes, etc., where a light timber is desired. The trees will not generally furnish over two logs, owing to the short bole and the buttressed roots.

Many of the other larger species will furnish good saw material, though the number of trees of each species is so small that only a limited amount of timber can be secured of any one species without covering a large territory. The smaller species, such as bolong-eta, alupag, boc-boc, and camayuan are in general of a size suited for poles, posts, and small sills, but of such materials of small dimensions a large amount can be secured.

DAMAGE.

The principal damage to forest growth is from fungi which attack tanguile, lauan, and some others quite readily. Insects apparently injure the living trees to no appreciable extent, though attacking dead timber in a very short time. The damage to living trees from vines is small, except in the case of balete, which in time reaches the form of a tree growth. This starts as an epiphyte on a great variety of trees, but is generally more common on tanguile than any other one species. It commences in the crown of the tree, generally in a crotch, sending out aerial roots, which by means of small tendrils cling to the body of the host tree, and gradually creep downward and upon striking the soil take root. In time these roots almost completely envelop the tree and kill it. The wood is of no value, but the bark yields a whitish juice, which can be made into a form of gum. This juice and also the leaves of the tree are supposed to have medicinal qualities.

This species occurs at all elevations within the merchantable timber line. There is another species of balete, rarely found here, which is of good form and suitable for the construction of bancas.

In the following list will be found the various species of trees 8 inches and over in diameter, found in the southern part of the province, in the region covered by the investigation. This list gives the common name by which the trees are known in the province, and as far as possible the generic name, and the group under which it is classified in the "Forest Regulations."

The species of southern Bataan.

Common name.	Genus.	Group.
Acle	Pithecolobium	1
Aclen-Parang	Albizzia	3
Agay		
Alalangat	Adenanthera	2
Alalunga		
Alangang		
Alasan		
Alisiis		
Almaciga		
Alupag	Nephelium	2
Amuguis	Odina	2
Amuyon	Xylopia	4
Anadlang		
Anabo		
Anabung		
Anagap	Pithecolobium	3
Anagatli	Canarium	
Anarong		
Andolan		
Angninin		
Aniatan	Ochna	3
Anapo		
Antipolo	Artocarpus	P.
Apios		
Anunung	Cordia	3
Anubing	Artocarpus	1
Apis-Apis		
Apitong	Dipterocarpus	3
Apulong	Osmoxylon	
Auili		
Baacon		
Babayan		
Bagna		
Bago	Gnetum	
Balacat	Zizyphus	3
Balacbac	Eugenia	
Balete	Ficus	P.
Balinaonao	Capura	4
Balingbing		
Balinhasay	Buchania	3
Balucanat	Aleurites	3
Banaba	Lagerstræmia	2
Banacalan		
Banao		
Banal		
Banati		
Banato	Mallotus	4
Banabanyan	Stereospermum (?)	3
Banay		
Banga	Calyptrocalix	5
Bangcal	Sarcocephalus	2
Banquid		
Banquir		
Baniguisa		
Bani		
Bani-Bani	Stereospermum (?)	3
Banyar		
Barangoi		
Basac		
Baticulan		
Baticuling	Litsea	1
Batitinan	Lagerstræmia	1
Bayabas	Psidium	3
Bayan		
Bayog	Pterospermum	3
Bignay	Antidesma	3
Bilucao	Garcinia	4
Binouang	Octomeles	4
Binunga	Macaranga	4
Bitog	Calophyllum	3
Biton		
Boc-Boc	Streblus	4
Bolong-eta	Diospyros	2
Botong	Baringtonia	4
Bungalon		
Bubuy	Eriodendron	4
Bulac		
Bulacdamo		
Buta-Buta	Excoecaria	
Cabot		
Cabuyao	Citrus	4
Cacayasen		
Caetana		
Cahoy-biic		
Cahoy-buur		
Cahoy-dalaga	Zollingeria	4
Caiasan		
Cairocan	Beilschmedia	
Calabuyo		
Calamansay	Terminalia	1
Calayocoi		
Calios	Streblus	3
Calivas		
Calong-caging		
Calumpit	Terminalia	3
Camagon	Diospyros	3
Camanchiles	Pithecolobium	3
Camansalay		
Camayuan	Gymnosporia	1
Caming		
Caminge		
Camoong		
Camuning	Murraya	1
Cana fistula	Cassia	2
Canumay		
Caping-ulo		
Cara		
Caraya		
Casoy		
Catmon	Dillenia	2
Cato		
Caton bacalao		
Cilisilihan		
Citing-citing		
Colo		
Corig		
Culis	Memecylon	4
Cupang	Parkia	3
Dalinas	Polyethia (?)	
Dalindigan	Shorea	3
Dampol	Bishopia	
Danglin	Grewia	3
Dao	Dracontomelun	3
Dap-dap	Erythrina	4
Darangin		
Daray		
Dia	Zizyphus (?)	
Dilac		
Dila-dila	Excoecaria	4
Dirita	Alstonia	
Ditae	Alostonia	3
Diton		
Dolit		
Dungon	Heritiera	3

The species of southern Bataan—Continued.

Common name.	Genus.	Group.	Common name.	Genus.	Group.
Duplac	**Zizyphus**	3	Ngisingisi		
Galis			Ngisingisi-ulo		
Gati			Ninabatay		
Guijo	**Shorea**	2	Nivatay		
Guilac			Opac		
Guisihan	Ratonia	2	Opplay		
Guyon-guyon	Cratoxylon	3	Pagsainguin	Canarium	3
Hipus-hipus			Pahotan	Mangifera	2
Ipil	Afzelia	S.	Paho		3
Lab-lab			Palac-palac	Palaquium	P
Labac			Palicpican		
Labunyo			Palo-Maria	Calophyllum	3
Labuyo			Paluchina		
Lago			Pamaytolon		
Laguina			Panao	Dipterocarpus	3
Lagundi			Pandacaqui	Tabernæmontana	4
Lamio	Dracontomelum	4	Pandan	Pandanus	
Lamug			Panaloion		
Lanete	Wrightia	1	Panganan	Quercus	
Lano			Pangayranin		
Lanutan	Thespesia	2	Pangi		
Lapinac			Pappling		
Latauan			Paquiling		
Lauan	Anisoptera	3	Paræp		
Laylayan			Pasac	Parinarium	2
Leosen			Patangis		
Letoc			Paysapis (Palo-sapis.)	Shorea	3
Libas					
Ligaa			Pincapincahan	Oroxylum	3
Ligag			Puas		
Ligas	Semecarpus	1	Puavi		
Lunas	Lunasia	4	Puso-puso		
Mabanot			Putat	Barringtoniana	4
Mabantut			Putian	Eugenia	
Mabayan			Puyaui		
Maguilic	Litsea	4	Sagayatcatot		
Malabaquis			Salap		
Malabitog			Samiling		
Malabonga	Iteadaphne	4	Sampaloc	Tamarindus	3
Malabulac	Bombax	4	Sandana	Anisoptera	3
Malacacao	Talauma	4	Santol		
Malacadios	Myristica	3	Sao-sao-lalaqui		
Malacamanga			Sasaa		
Malacaminge			Sulipa	Gardenia	4
Malanarayum			Susum biic		
Malacatabi			Taclanganac		
Malacatmon	Dillenia	2	Tagatoy		
Malacauyan	Stemegypora	4	Tagom		
Maladanglin			Tagpo		
Malagos			Taliantan		
Malaicmo	**Celtis**	4	Talibagot		
Malalunga			Talimurong		
Malaoban			Talisay	Terminalia	3
Malapapaya	Polyscia	4	Talobasin		
Malapatpat			Talongatingan		
Malaringin			Tambao		
Malaruhat	Eugenia	2	Tanag	Kleinhovia	4
Malasampaloc			Tanaquitic		
Malasantol	Sandoricum	4	Tanguisan bay-ouac.		
Malasoca					
Malatadiang	Canthium	3	Tanglin		
Malatalang			Tanguile	Shorea	2
Malatumbaga	Crudia	2	Tapinac		
Malosa			Tauto		
Matamas			Tibig	Ficus	P
Manicnic			Tindalo	Afzelia	S
Mareg			Tuco		
Marantic			Tucodlangit		
Matang-olang	Salacia	4	Tuoy		
Mayapis			Ualing		
Molave	Vitex	S	Ui-ui		
Molauin-aso	Premna	2	Ylang-ylang	Cananga	P

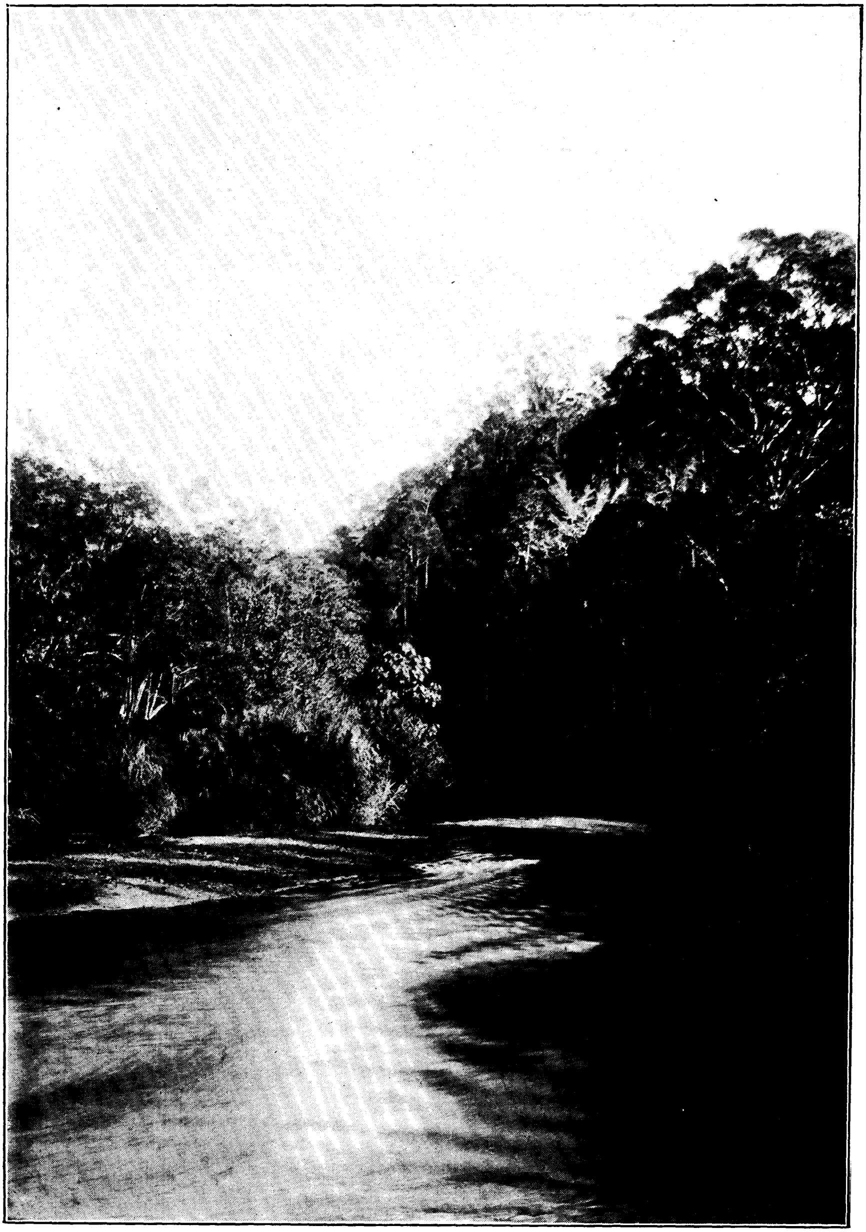
FOREST MANAGEMENT.

The greater part of the merchantable timber in Bataan Province is composed of a few species generally of a small diameter, which at the present time have but little value in the market. Many of these it will be desirable to remove in order to improve the conditions of the better species, and also to remove the seed trees of the undesira-

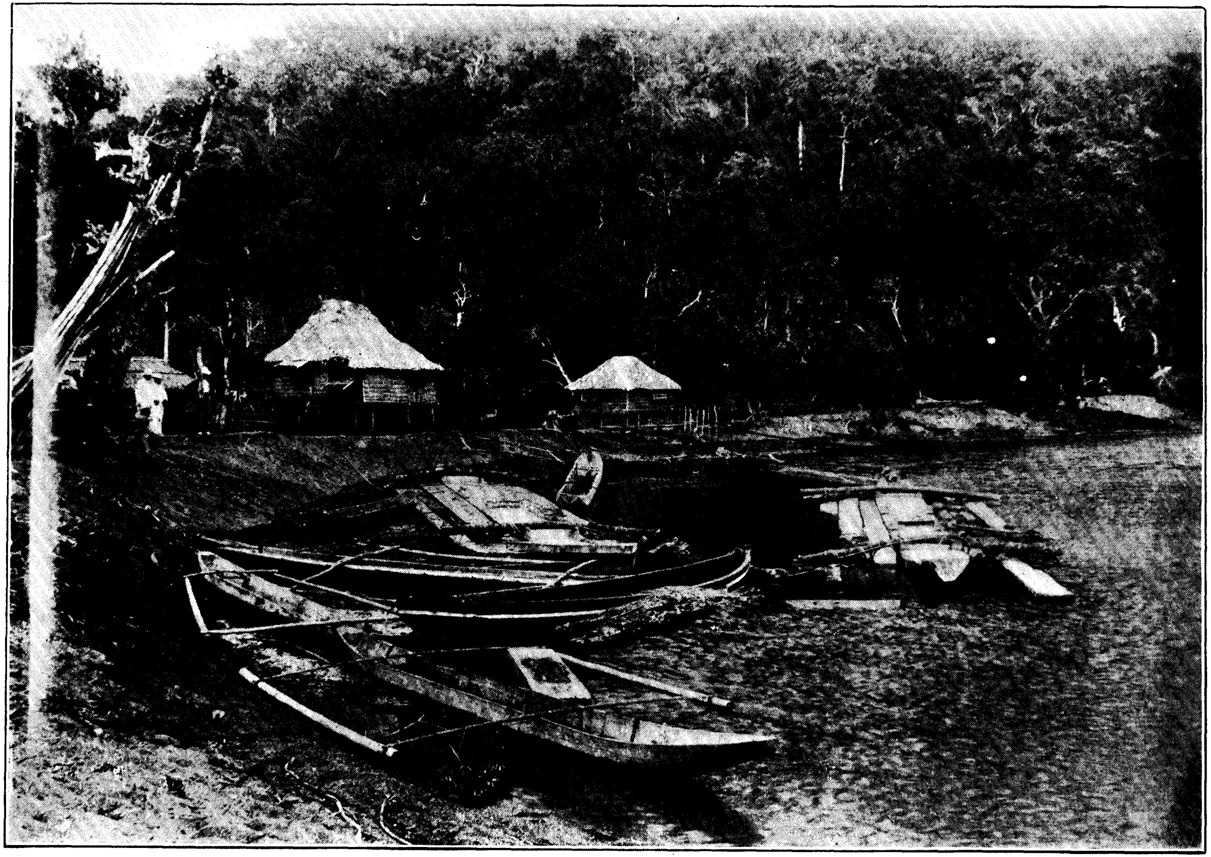
NIPA PALM, FROM WHICH ROOFS AND SIDES OF HOUSES ARE MADE, CULION ISLAND.

POINT WHERE ROAD FROM LEPER COLONY WILL REACH TIDE WATER ON HALSEY BAY.

Ground on left high, that on right low and covered with nipa palm.

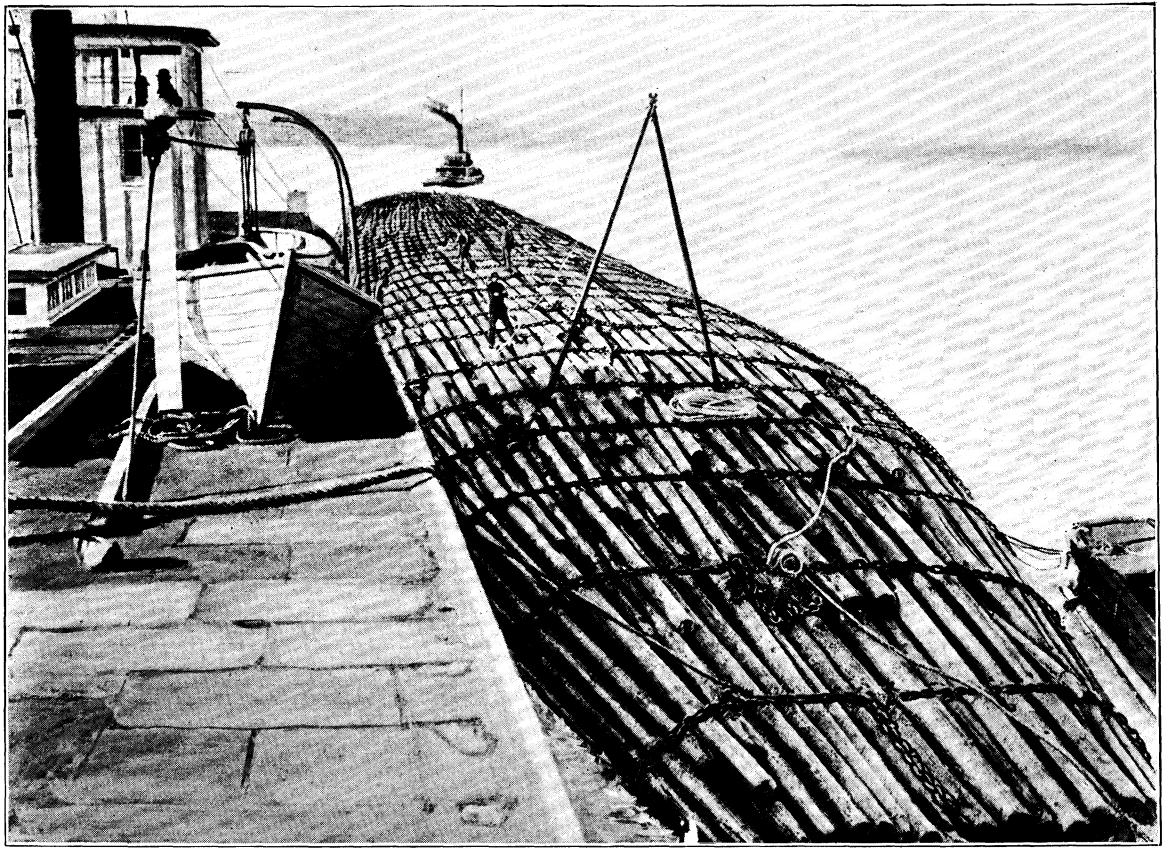


RIVER SCENE, SHOWING DENSE FOREST GROWTH.

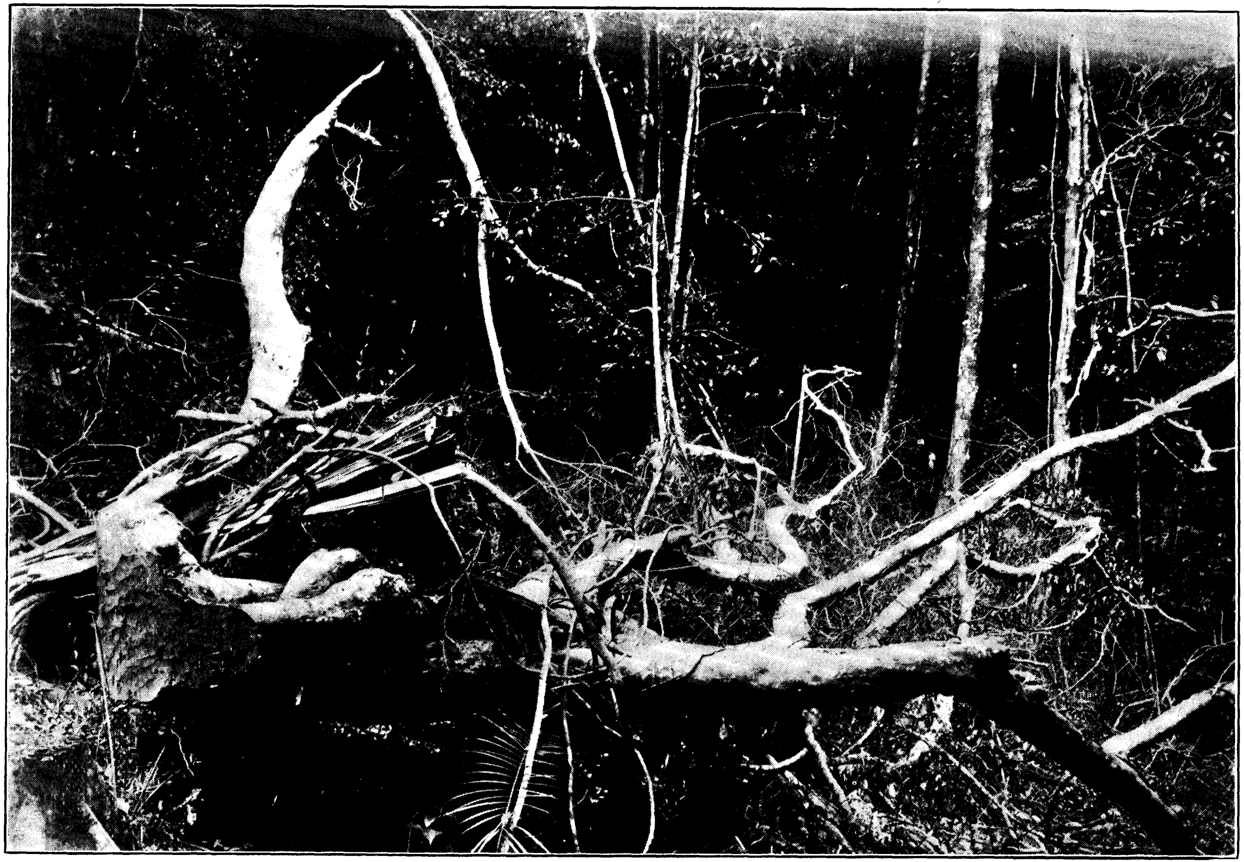


SMALL RAFTS OF HEWN TIMBER AND ROUGHLY HEWN BANCAS, DALUPOAN, CAMARINES SUR.

Approximate volume of each raft 250 cubic feet. The largest rafts towed into Manila never exceed 6,000 cubic feet.

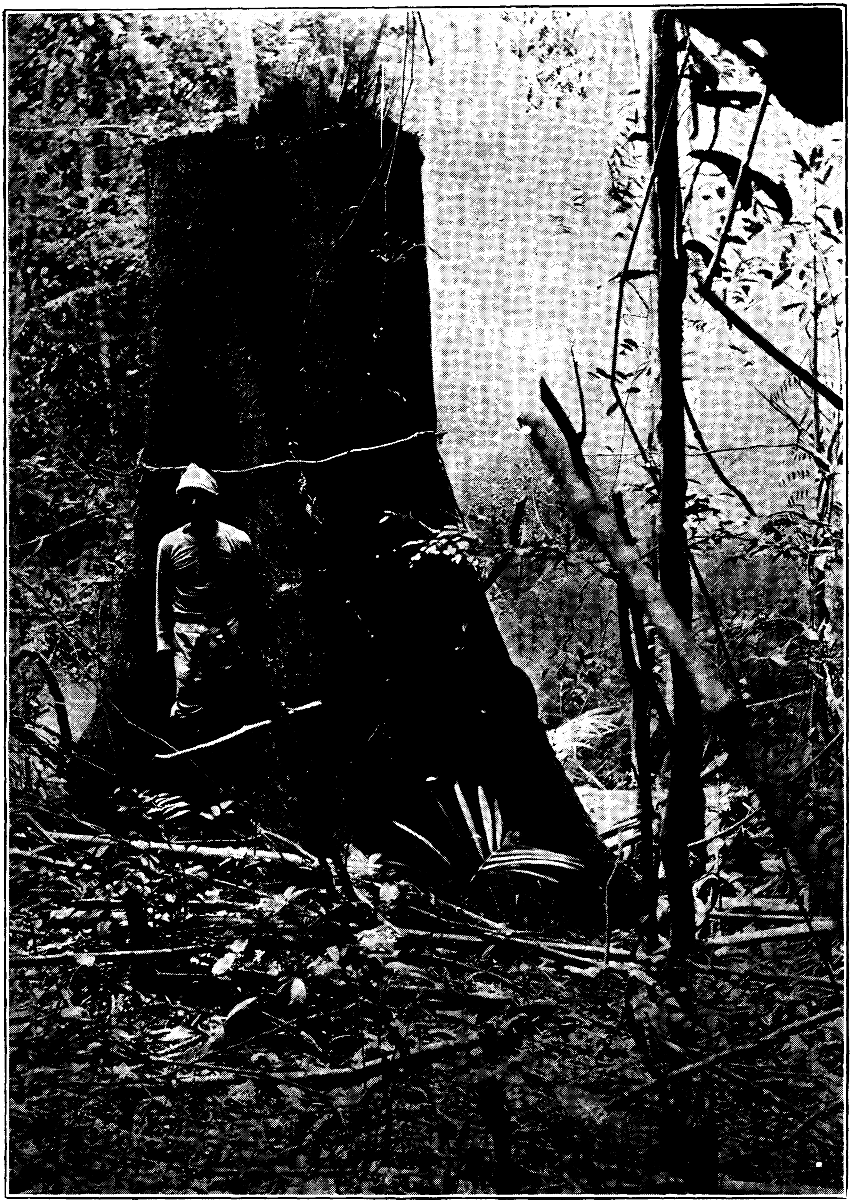


ON THE COLUMBIA RIVER, OREGON. LOGS CONTAINING 6,000,000 FEET OF LUMBER, ABOUT 600,000 CUBIC FEET.



LARGE MOLAVE TOP, WITH LIMBS 20 INCHES IN DIAMETER, WHICH WAS LEFT IN THE WOODS.

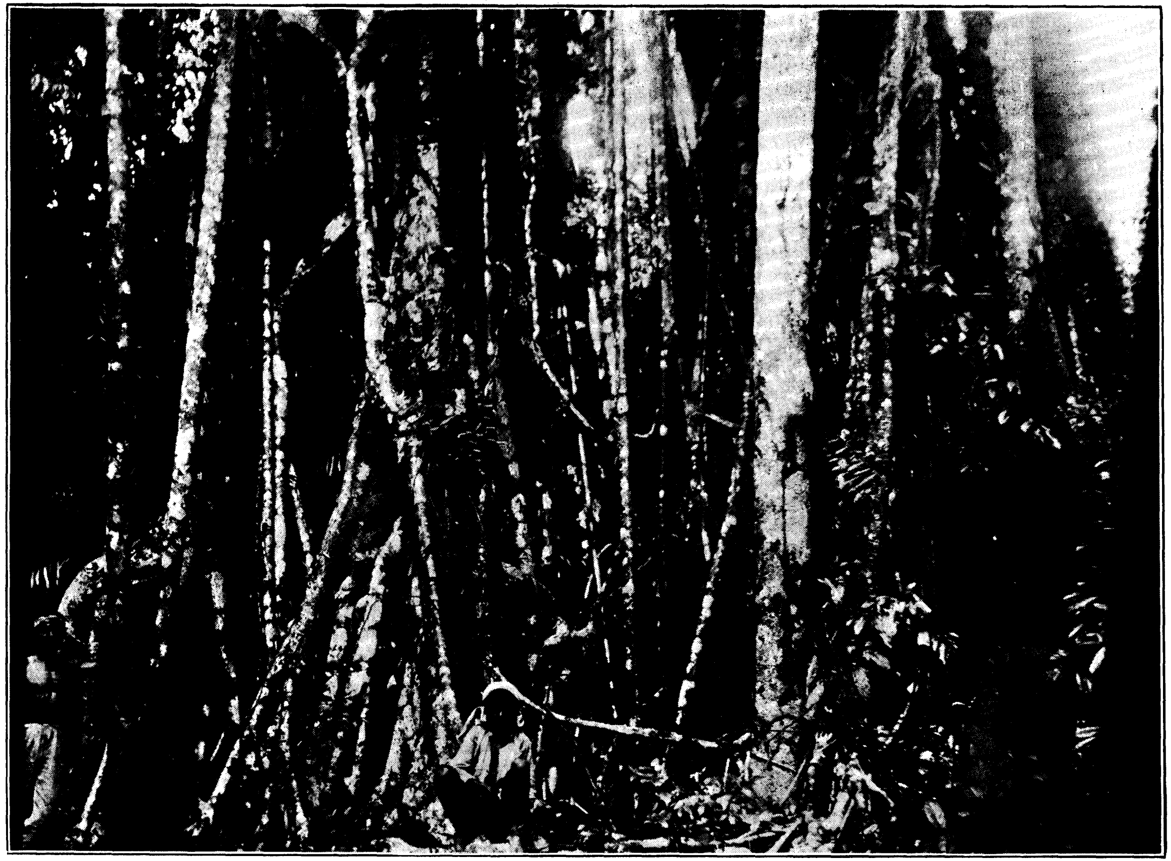
For many years this will keep down all young growth and should have been used.



LAUAN STUMP 13 FEET HIGH.

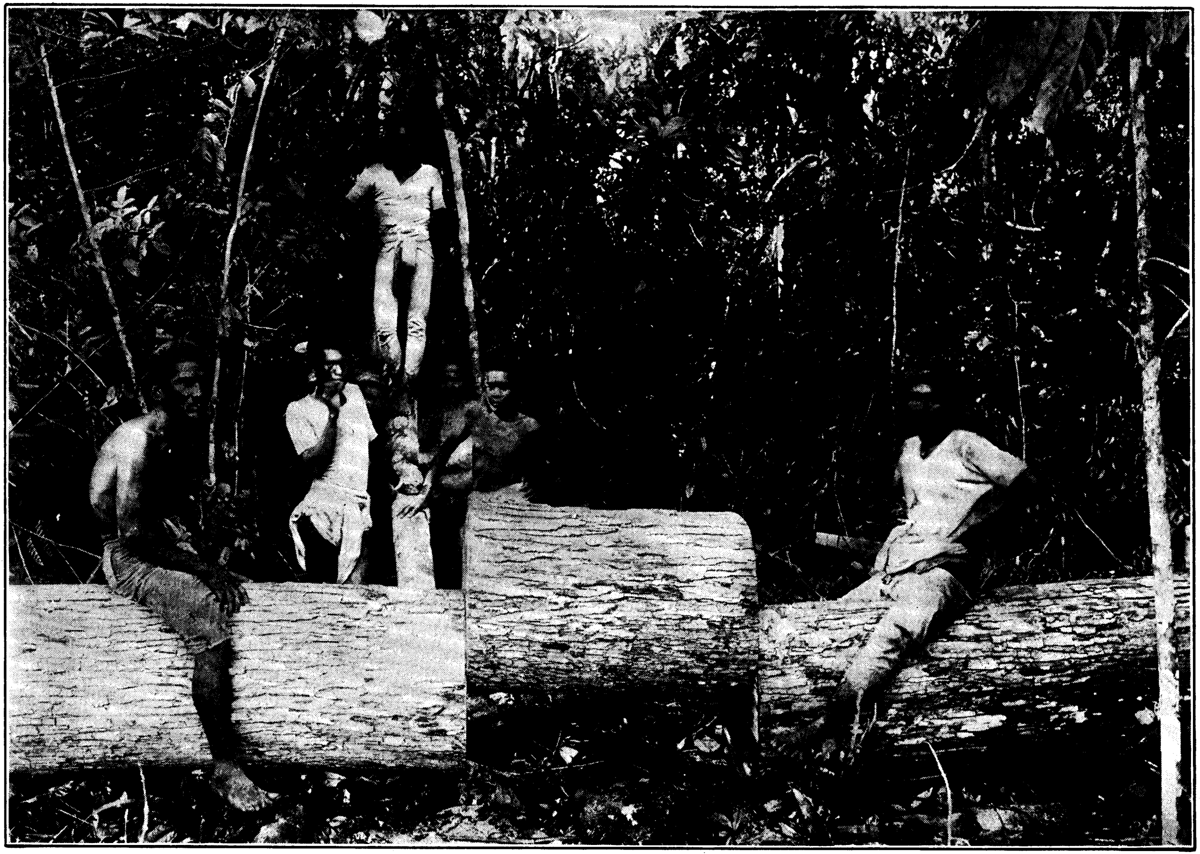
Large banca was cut from this tree.

TANGUILE WHICH HAS BEEN CUT FOR BANCA, AND THE VERY LARGE OPENING WHICH IS MADE IN THE FOREST BY THE FALL OF ONE TREE.



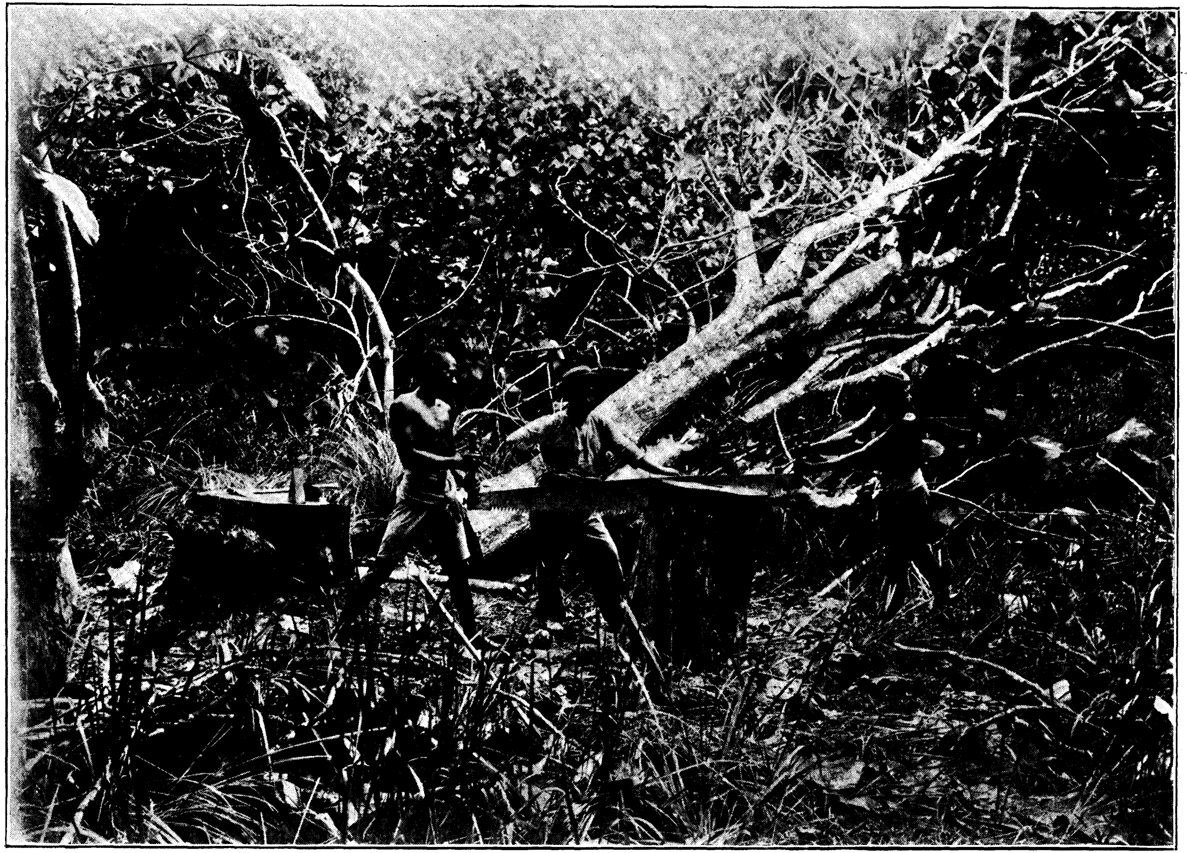
LARGE BALETE, ABOUT 30 FEET IN DIAMETER AT THE BASE.

GETTING READY TO SAW A SAMPLE OUT OF A LARGE IPIL TREE JUST FELLED.

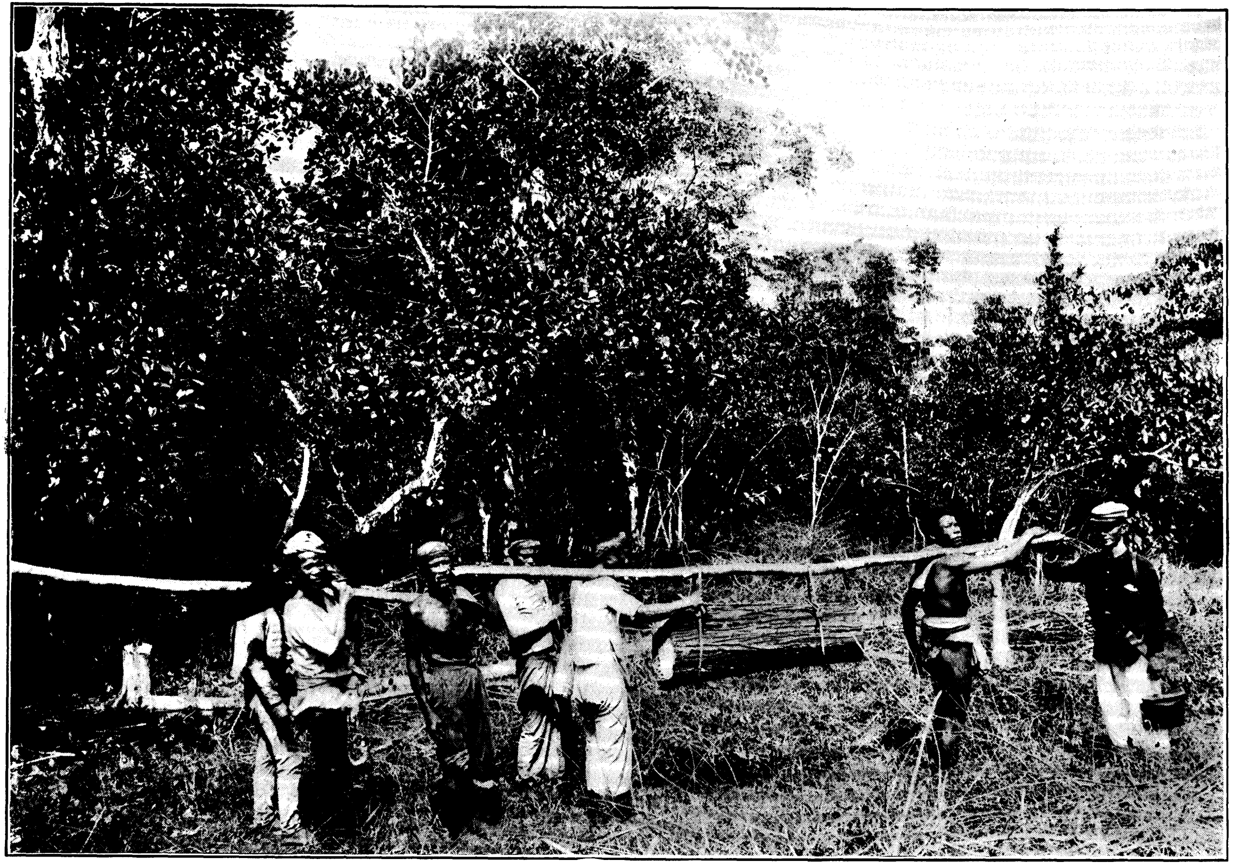


JOLOANO-SAMAL MOROS SAWING OUT WOOD SAMPLE.

One-half of the piece sawed out was enough for 8 men to carry through the jungle.

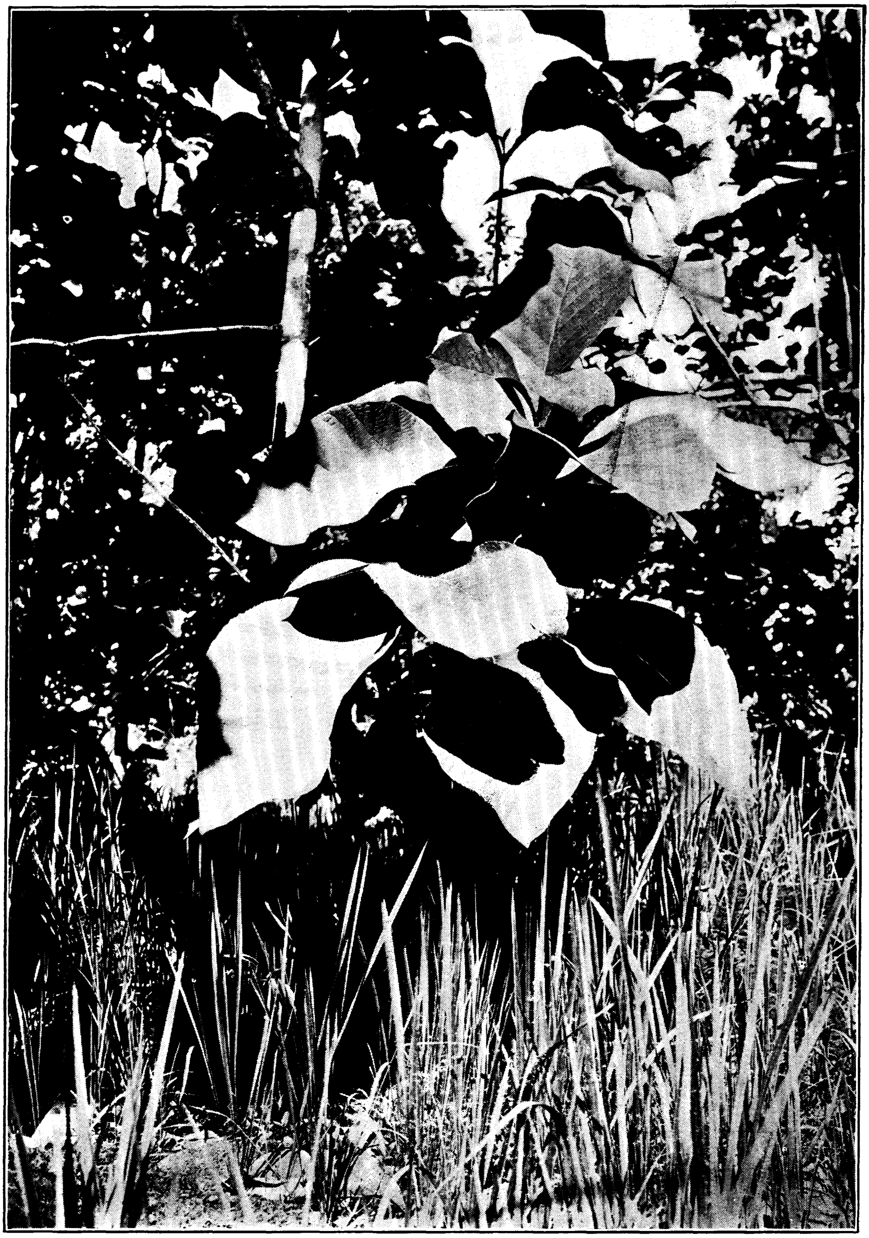


JOLOANO MOROS SAWING TEAK SAMPLE, ISLAND OF JOLO.

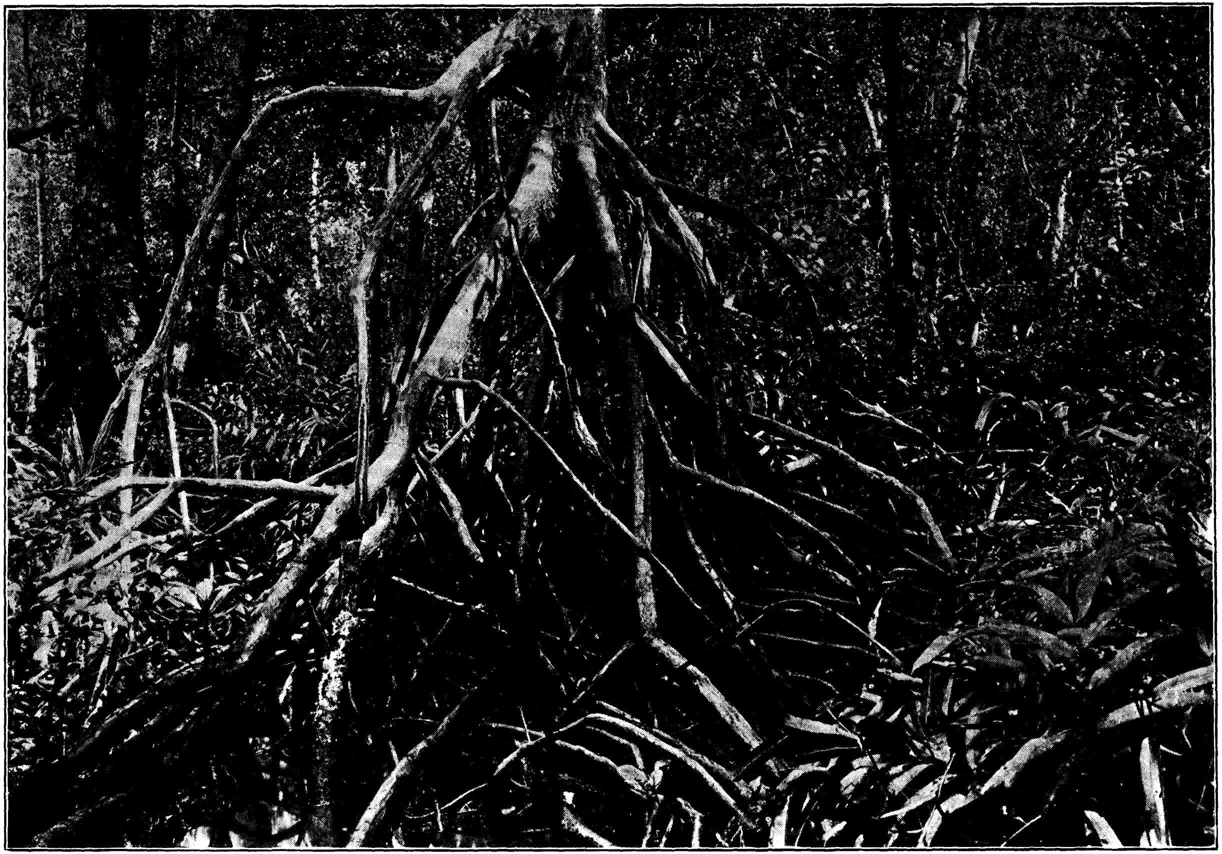


MOROS CARRYING A WOOD SAMPLE—TWO MOROS GOING AHEAD TO CUT A PATH THROUGH THE JUNGLE.

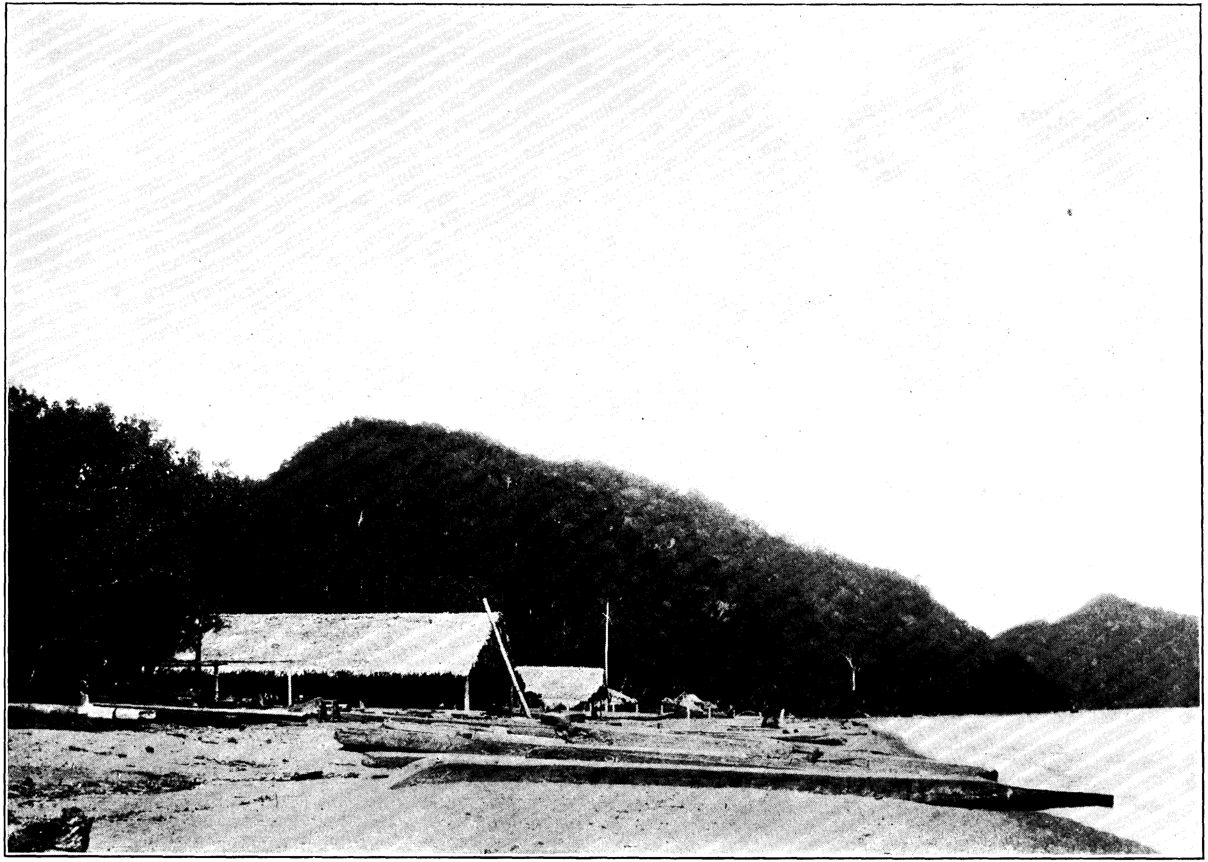
Two small vines of green rattan will hold the heaviest sample.



A TEAK STOOL GROWING IN THE FOREST NEAR THE CITY OF JOLO.



ROOTS OF THE BACAGUA TREE IN A PARTIAL SWAMP, BONGAO ISLAND.



GENERAL VIEW OF THE PHILIPPINE LUMBER AND DEVELOPMENT COMPANY'S MILL YARD AT DALUFOAN, CAMARINES SUR.

ble species as far as possible without opening up the stand to too great an extent. Owing to the nearness of the Manila market, a considerable portion of the smaller material can probably be worked up into cordwood, which at the present time can be laid down in Manila at a cost of from 20 to 26 pesos per 1,000 rajas.

The market price at the present time for rajas, superior class sticks 4 to 5 inches in diameter and 36 inches long is $40 to $50 per 1,000 rajas.

Rajas, first class, with sticks 3 inches in diameter and 36 inches long, sell for $20 to $30 per 1,000 rajas.

Rajas, intermediate class, containing sticks of both superior and first class, sell for $28 to $35 per 1,000 rajas.

Split sticks about 24 inches long and 1 inch in diameter are retailed at the wood yards 3 to 4 sticks for 1 cent, according to grade.

The larger-sized trees with good form can be made into telegraph and telephone poles, for which there is a large demand at the present time.

Considerable difficulty may be experienced at first in making the lumberman cut anything but the larger and better class of timber, for it is from these that the largest profits will be secured. However, if only the better species are cut, the forest will soon only consist of inferior species. In order to prevent this it will be necessary to mark all timber which is to be cut and restrict the cutting to marked trees only, a sufficient force of rangers being provided to see that the regulations are complied with.

All the timber cutting in this province has been done by many parties, holding small licenses, most of the timber being cut for bancas. The man holding the license rarely goes into the woods himself, but hires men by the day or by contract to go into the forest, select the trees and cut the timber, and hew the bancas for him. The native workmen practice a severe selection system, picking out the most sound and best-formed trees, usually of the middle diameters, as they are unable to handle the largest-sized timbers, owing to the poor transportation facilities. The trees cut are usually scattered over a large area, and as the various licenses at present cover a large territory supervision is very difficult. The result is that in the past a great waste has taken place, often only one short banca being taken out of one tree and from 20 to 40 feet good lumber left in the top. In cases where the tree in falling has lodged in a place where it is somewhat difficult to remove, the entire tree is left. In either of the above cases the licensee should be held responsible for the full amount of timber cut, and the ranger should inspect the same and see that the regulations are complied with. Sections 1 and 2, article 62, "Regulations governing the utilizations of forest products," have been repeatedly violated in the past.

These sections are as follows:

"SECTION 1. The trees to be cut shall be selected and cut down close to the ground, care being taken that no damage be done in falling to the adjacent trees. The concessioner shall compactedly pile the branches where the least damage shall be done to the younger growth.

"SEC. 2. Forest products shall be transported as far as possible by routes where there are few trees, avoiding as far as practicable the destruction of the younger growth."

At the present time the stumps are cut entirely too high, often 10 to 12 feet above the ground, thus wasting a large amount of valuable timber. In some cases it is necessary to cut several feet above the ground on account of root swellings, but generally the stumps are cut much higher than is necessary.

In felling, no attention is paid to avoid injuring adjacent trees, and sometimes considerable damage is done to saplings and young growth, especially by the large heavy-limbed tops. The branches of the crowns are never lopped or piled up, but left as they fall.

The disposition of the larger material in the tops will be a serious problem in a large lumbering operation. In parts of the islands, wher emolave and certain other superior group woods are abundant, it is found to be profitable to bring all large limbs into the market, almost the entire tree having a merchantable value; but in Bataan Province, where the majority of the merchantable trees are second and third group timbers, the tops have but little value at the present time in the market.

This material should not be left in the woods, but worked up into box material, charcoal, or some other form, which would at least cover the cost involved and rid the forest of a large amount of material which, if left, would be a menace to the forest in the dry season on account of fires.

At the present time in the Manila market charcoal sells for $1 to $1.20 Mexican per sack of 27 "gantas." In some places in the islands charcoal can be laid down on the beach for 20 cents Mexican per sack, the freight charges to Manila generally being one-half the selling price of the same in the Manila market, leaving a profit of

30 to 40 cents per sack. In the past the cutting has been so scattered that there has been but little damage resulting from fires, but when lumbering operations on a comparatively large scale take place, and there is a large amount of brush on a limited area, the danger from fire will be greatly increased, and the regulation in regard to lopping and piling tops must be strictly enforced. Timber at the present time, is taken out by the shortest and easiest route, without regard to the presence of the young growth, and valuable species are frequently cut to build scaffolds for cutting timber, and also to serve as rollers in the skidding trails.

Holders of firewood licenses, especially in securing firewood for use in the small towns, frequently cut in small amounts the better classes of timber, prohibited for firewood, paying little attention to the species, but taking that which is most convenient to get out.

A lumber company working under the direction of the bureau of forestry will experience, no doubt, some trouble with their workmen at the start, as the natives for years past have been in the habit of following loose methods and cutting where and what they wished. The class of natives who do the forest work are generally uneducated, and do not comprehend the meaning of a rational exploitation of the forests, and hence they will have to be gradually educated.

However, the operations of a lumber company whose work is localized in some one region can be supervised far more closely than is possible at the present time, and many of the existing evils can be corrected. In order to give some idea as to the cost of cutting timber in this region and getting the same to Manila, the following statement is given, taken from data collected by Mr. E. M. Griffith, in charge of division of forest management:

The following shipment was not actually made to Manila, but the data were secured from an actual shipment made to this city a short time ago from Olongapo, Zambales Province, near the northern boundary of Bataan Province. The entire work was done by contract, and the following will show the actual cost of the timber and the profit realized from the same:

Cost of cutting and bringing to Manila market 20,000 cubic feet of Panao, Lauan, and Apitong.

[All prices in Mexican currency.]

Government valuation, at 3 cents per cubic foot, plus 25 per cent additional, government valuation for squared timber	$750.00
Cutting and hewing, at 4 cents per cubic foot	800.00
Hauling to beach, ¼ mile, at 2 cents per cubic foot	400.00
Rafting timber and bejuco, at 3 cents per cubic foot	600.00
Towing timber, Olongapo to Manila, 2 days, at $200 per day	400.00
Total cost	2,950.00
Value of timber in Manila market, 40 cents per cubic foot	8,000.00
Cost of same delivered in Manila	2,950.00
Profit	5,050.00

Thus yielding a profit of 25 cents on each cubic foot, or 171 per cent on the investment.

At the present time the species named are selling considerably higher in the market, and the figures are certainly within a safe limit.

In the southern part of Luzon Island, on large operations where superior, first, second, and third group trees are cut, the average valuation charged by the government amounts to 10 cents Mexican per cubic foot.

In Bataan Province, however, owing to the small amount of superior and first group timbers, the average government valuation will be considerably less. The greater part of the merchantable timber here is in the second and third groups, which have a valuation of 8 and 3 cents, respectively, per cubic foot.

At the present time much of the cutting, hewing, and hauling is done by contract, the timber companies paying the natives a certain price per varas (33 inches) and puntos (1.09 inches) for squared timber, delivered on the beach.

The following scale of prices is paid by one of the larger companies operating in southern Luzon, and though the species are not the same as many which are found most abundantly in Bataan, yet it will serve to show the approximate cost of getting out timber of other species than those mentioned previously.

Tariff for timber delivered on the beach, Banaba, Batitinan, Guijo, Malacadios.

Dimensions.			Value.			Excess for each additional puntos.	
Feet.	Inches.	Inches.	Pesos.	Reales.	Cuartos.	Reales.	Cuartos.
13.6	10.9	10.9	....	6	....	....	7
16.3	10.9	10.9	....	7	10	....	15
18.2	10.9	10.9	1	1	....	....	15
21.8	10.9	10.9	1	4	....	....	15
24.6	10.9	10.9	1	5	10	....	15
27.2	10.9	10.9	1	7	....	1	10
30.0	10.9	10.9	2	....	10	1	10
32.7	10.9	10.9	2	2	....	1	10
35.5	10.9	10.9	2	3	10	1	10
38.1	10.9	10.9	2	5	....	1	10
40.9	10.9	10.9	3	....	....	3	....
43.6	10.9	10.9	3	....	....	3	....
46.4	10.9	10.9	3	6	....	3	....
49.0	10.9	10.9	4	4	....	4	10
51.8	10.9	10.9	4	7	....	4	10
54.5	10.9	10.9	5	2	....	6	....
57.3	10.9	10.9	6	....	....	6	....
59.9	10.9	10.9	6	3	....	7	10
62.7	10.9	10.9	6	6	....	7	10
65.5	10.9	10.9	7	4	....	9	....
68.2	10.9	10.9	7	7	....	9	....

Peso=42.5 cents gold.
Real=5.3 cents gold.
Cuarto=0.5 cents gold.

The market price per cubic foot which prevails at the present time in Manila for squared timber is as follows:

	Cents.		Cents.
Amuguis	60-65	Guijo	55
Apitong	60	Batitinan	50
Panao	60	Manicnic	36
Lauan	45	Palo-Maria	30
Tanguile	60		

The species furnishing the greater part of the merchantable timber here do not reproduce abundantly below a diameter of 18 to 20 inches, and in order to secure good reproduction after lumbering the better species should not be cut below a diameter of 20 inches except in places where an overabundance of seed trees would be left. In other places it may be necessary to leave some seed trees above this diameter. Any variations from the rules must be left to the marker, who should be a man of good, sound judgment. The best means of lumbering this region, owing to the poor transportation and the size of the timber, is by means of a wire-cable system. At the present time there are not sufficient carabaos in the province to work the fields, and much difficulty is experienced in securing carabaos in sufficient numbers to carry on the small amount of lumbering in progress at the present time.

The scarcity of the animals, the high valuation of the same ($100 to $200 Mexican), the comparatively small amount of work renderable, and their inability to handle the largest sized timbers practically eliminates them as a factor in lumbering operations of any size.

It is questionable if American or Australian horses would stand the work in the forest here. It is certain that they could not perform the same amount of labor as American horses do in the forests of the United States.

With the introduction of modern machinery it will be necessary to have American foremen in the forest to take charge of the several branches of the work and instruct the natives in the methods of American lumbering.

The labor conditions in this province are not as satisfactory as could be desired. The natives as a whole are inclined to be indolent, and do not care to work in the forest for any length of time. The only works of any size going on in the province at the present time are at the stone quarry and the shipyard near Mariveles. At the quarry the company found that they were unable to work the natives of this province, and were forced to import men from Pampanga and one of the southern provinces in order to carry on the work successfully. The superintendent of the shipyard has also had considerable difficulty in keeping men at work for any length of time. The men employed by him were classed as skilled carpenters, and what is true of the skilled labor is true in a greater degree of the unskilled labor. The average wages of laborers in the forest varies from 40 to 80 cents Mexican per day, with subsistence. The more experienced men receive from 60 to 80 cents, and the inferior laborers from 40 to 60 cents.

Laborers furnishing their own subsistence usually receive $1 Mexican per day. Carabao labor varies somewhat in price, but is usually from $1 to $1.50 Mexican per day, with driver.

RECOMMENDATIONS.

At the present time there is a large amount of mature and overmature timber in the province which should be taken out as soon as possible, preferably by some company rather than by a large number of licensees as at the present time.

The main advantage of a single company or a few companies will be the greater ease of supervision and placing of responsibility, which, under the present system, is difficult. They will also be able to take out the largest-sized trees, which under the present methods are not removed on account of the difficulty of handling the same. These trees have in most cases reached maturity, and each year are becoming less valuable, so that it is desirable that they come out as soon as possible.

There should be a more rigid enforcement of article 62 of the forest regulations in regard to the felling of timber, the piling of the tops, and the preservation of young growth.

Also the paragraph in article 63 in regard to felled timber left in the forest after operations have ceased. All timber which is to be cut should be marked, and all marked timber cut, unless a satisfactory reason can be given for not doing so.

Owing to the scarcity of superior and first group timbers in this province, and the poor reproduction of the same, none should be cut except under the direction of some forest official.

The companies operating in this province should not be permitted to cut only the best class of timber, but should also be required to take marked timber which will pay the least profit, in order that the condition of the forest may be improved and the inferior species weeded out.

March 18, 1902.

The Secretary of the Interior,
Manila, P. I.

Sir: I have the honor to inclose herewith a special report of P. L. Sherman, inspector, forestry bureau, on forest conditions in the Sulu Archipelago and southern Mindanao, Philippine Islands.

From this report we gain many additional data concerning the rich forest resources of the southern islands. But a very small percentage of the timber cut in the Philippine Islands comes from this region, due to various causes, namely, lack of labor, transportation facilities, and distance from Manila market, and very little timber will be cut by the small contractor for some years to come. The only parties able to get much timber in this southern country, in fact, anywhere in the Philippine Islands, will be the large companies well equipped with modern appliances for logging and milling.

The policy of this bureau will be to make a thorough investigation of these regions where large companies contemplate operating. The work by the field parties will begin with the reconnoissance of every part of the tract to be operated over, including a rough sketch map of the same, and followed by valuation surveys of about 1 sample acre in each 25, at the same time making, as far as practicable, a botanical collection as the work progresses.

There is but one spot in the southern islands where any large operations are contemplated at present, namely, at Santa Maria, Zamboanga district, where a field party from the forestry bureau will be sent in the near future to inaugurate the work outlined above.

Very respectfully,

George P. Ahern,
Captain, Ninth U. S. Infantry, Chief of Forestry Bureau.

Manila, P. I., *March 3, 1902.*

Capt. George P. Ahern,
Chief Forestry Bureau, Manila, P. I.

Sir: In accordance with instructions issued from your department, I have the honor to make the following report on forestry conditions in the Sulu Archipelago and southern Mindanao:

POSITION AND EXTENT OF FORESTS.

A study of the forests of all of the southern islands shows that they occupy practically all of the land which attains to an altitude of even a few hundred feet above sea level. A trip along the southern coast of Mindanao, for example, will illustrate very clearly the forest formations. First comes the shore land, often open and heavily grassed, and in other places wooded, even on tide lands, with densely growing mangrove and other trees that, as the land rises to the foothills, give place to high growing trees and tropical jungle, and so on to the mountains beyond, range behind range, so far as the glass can reach, all is forest.

In contradistinction to the forest lands which follow the hill and mountain formations, we find the open lands in the river valleys and low-lying lake regions. The best example of this is in the valley of the great Rio Grande, which, beginning at Cottabato, extends for miles on miles in a T-shaped formation to Sarangani Bay on the south, and to the north no one knows how far, with miles of width as well, yet contains scarcely a tree, certainly no forest.

In Basilan and the rest of the Sulu Archipelago the general formation is the same, the high islands of a volcanic origin being densely wooded from the seashore up, while the low lying coral islands are generally wooded, but contain no high timber. Tawi-Tawi is the best timbered island in the archipelago; in fact, with the exception of one or two small districts, it is wooded and even timberd from end to end. Bilatan, to the south of Tawi-Tawi, comes next in amount of timber. Sulu Island itself has at present almost no forest, being mostly low and rolling. Its timber was confined to a few miles on the north and southeast coast, and even this, with the exception of a belt on the southeast coast, has been cut out.

VARIETIES AND NUMBER OF TREES.

Nothing is more discouraging to the wood collector in the southern islands than the confusion that arises from the varieties and names of the trees composing these tropical forests. Scarcely any two trees look alike, and when the trunks are enough similar to warrant the supposition that they are of the same variety, an inspection of the leaves, either through felling the tree or through much hard and dangerous climbing, discloses the fact that they are in no way related. It may be truthfully said that, with perhaps the one exception of the former teak forest in Jolo, there are no forests of any one or two kinds of trees anywhere in the southern islands, but rather aggregations of species and varieties mounting into the hundreds. A great deal of difference also apparently exists in the general conditions of growth of the forest. This is especially noticeable in the amount of undergrowth, some forests being almost a jungle of small trees, rattans, and other vines, through which one can only pass after a path is cut out with a bolo, while others are almost free from undergrowth, except for the scattered young trees which shoot up slim and straight to the light above. Some forests, especially on the coral islands, are of recent growth, having no large trees, but promise well for the future, while others, such as Bongao, have had their best varieties cut and the new growth is apparently of inferior kinds. It was my endeavor while visiting the various forest points to get answers to the following questions:

1. What is the number of trees having a circumference of over 3 feet, per acre?
2. What is the average height of these trees?
3. What species is the most abundant?
4. What species do the natives consider the finest?

JOLO.

The open, rolling nature of the island has already been referred to. The one forest worthy of the name which has not yet been destroyed is said to be on the south coast, east of the center. The natives were not peaceful enough to permit of my going there; in fact, the military were preparing for drastic measures in that direction. The forest feature most worthy of attention is, however, just outside the city of Jolo, and has been referred to as the exception to the general growth of southern Philippine forests. This forest, or rather former forest, of teak trees extends from Jolo south and west for nearly 10 miles, and in places is from 3 to 5 miles in width. There are no evidences that it was planted, but it certainly grew to the exclusion of all other trees. According to the information in Jolo, this forest was entirely cut down by the Spanish Government some twenty years ago. A very thorough job was certainly performed, for scarcely a tree is now standing which has any considerable size or age. From stumps of all old trees a multitude of stools grew up, and to-day they are of all sizes, from a foot to 40 or 50 feet high. A few are of a respectable size. The tree I selected for a sample was 58 feet high (see Wood Exhibit No. 1) and had a girth of 6 feet 8 inches at a height of 5 feet from the ground. It was 12 feet to the first limb, and fairly represented the shape of the average trees. Should, from the sample, this teak prove to be of superior variety, with some judicious cutting out of crooked and overcrowded stools and the prevention of the Chinese and natives from cutting the trees as soon as they reach a good size, a fine teak forest might yet be produced.

TAWI-TAWI, BONGAO, AND SANGA SANGA.

These islands, being of the same formation and only separated by narrow channels, may be considered together. They are still well wooded, and in former times must have contained magnificent forests. The Spanish, Chinese, and natives have cut trees in the last two islands for many years, and of course have taken some of the best timber; still, on account of the proximity of the forests to the town of Bongao and the number of natives (Filipinos and Moros), who have had much forest work and were more than ordinarily fitted to aid me in my collecting, I found it the best place in the Sulu Archipelago for securing samples of the most important woods of these islands.

The best-known species is probably the molave, which was formerly very abundant, and even now can be found in considerable numbers here. The tree selected for sample (see Wood Exhibit No. 4) had a height of 72 feet and a circumference of 5 feet 2 inches. To the first limb it measured 14 feet, where it was 4 feet in circumference.

This shortness of trunk I found characteristic of these trees in this locality. The ipil trees were of unusually striking appearance, being large, high, and with broad, spreading limbs, the ends of which bore very large seed pods. The sample tree (see Wood Exhibit No. 12) was 118 feet high, with a circumference of 9 feet 6 inches 8 feet above the ground. To the first limb it was 4 feet 7 inches, where the circumference was 8 feet 9 inches. On account of the small amount of white sapwood and the deep reddish brown of the heartwood, the natives considered the tree very old.

The narra trees had mostly been cut out; still the size and growth of those left show what must have been here at one time. The sample tree taken (see Wood Exhibit No. 9) was 100 feet high and 5 feet 5 inches in circumference above the buttresses. The height to first limb was 21 feet 5 inches, where the circumference was 5 feet. Not far from this we found another narra tree from which the natives had cut large pieces of wood from the buttresses. These pieces we found the following week for sale, for making barong scabbards, in the Bongao market. (See Wood Exhibit No. 9A.)

It took a long hunt to find any large-sized camagon trees, for these especially had been sought for by Spanish and Chinese and large numbers cut down. The one selected for sample (see Wood Exhibit No. 16) measured 21 feet to the first limb, the total height being 85 feet. The girth was 5 feet 5 inches, tapering to 4 feet 2 inches at the first limb. Upon sawing the tree we found the grayish-black heartwood to be very small in proportion to the white sapwood. This the natives accounted for by saying that in soft, wet soil the heartwood was always small; in rocky ground, on the contrary, always large. This camagon tree was growing within 100 feet of the sea in soft, wet ground. Within a short distance of it, along the shore, were several fine dungon trees, one of which was felled for a sample. This had a height of 76 feet, the first limb being 21 feet above the ground. In circumference it was 5 feet 7 inches above the buttresses, which reached 9 feet, while at the first limb it measured 4 feet 8 inches. When felled, we found a large heartwood of deep red color, the sapwood being white. On account of the variance of the leaves with those commonly called dungon, I would not be surprised if this tree proved to be a different species or variety from the northern dungon, but it certainly is highly prized by the natives of Tawi-Tawi, who use it for the handles of their krises and barongs, considering it only second to camuning in this respect. Another tree which resembles this, and is considered a very good timber, is the guijo, belonging to the second group. The tree selected as a sample (see Wood Exhibit No. 3) gave a straight log 42 feet long, 4 feet 10 inches in circumference at the base, and 3 feet 5 inches at the small end. Height of tree, 94 feet.

In order to find the new species of trees which seemed of special value, as well as to get an idea of the number of trees per acre where as yet the forest had been untouched, I spent ten days encircling the islands of Tawi-Tawi, Bongao, and Sanga-Sanga, stopping at all the villages to question the natives, and touching at various points on these and adjacent islands where the forests seemed worthy of special study. As I was always close to the coast and had with me several natives who had lived in the vicinity all their lives, and worked for every Spaniard and Chinaman who had cut wood during that time, I was able to acquire a very good idea of the general forest conditions. The finest spot on the south coast is undoubtedly in the vicinity of the small village of Buan. Here the forest starts practically down at high-water mark and extends unbroken over the mountains to the northern coast. An acre proved to have 48 trees, each one having a circumference of over 3 feet. As there was no way of taking out any wood samples, I disliked cutting down any trees, but their average height we agreed upon as 125 feet. Many of the trees had a circumference of 20 to 25 feet, with a height of 60 to 70 feet to the first limb. The largest trees were undoubtedly of the cedar or spruce class, and gave a pitch called by the natives "poot." The trees which the natives picked out with great pride and said were equal to molave and ipil, they called giam, the synonym of which I can not find in any forestry book, nor does it seem to be related to the species bearing the easily confused names of guijo and guisoc. The giam trees were of large size, high, and very plentiful. Associated with them were large trees called palambuyon and pisang-pisang, samples of which I secured in Bongao.

Passing around the eastern end of Tawi-Tawi we entered the forests in these places on the northern coast; here the trees also grew near the shore and were in fine condition. An average acre selected near the northern central part of the island gave 43 trees to the acre, each one being over 3 feet in circumference. The average height we estimated at 100 feet, some growing as high as 125 feet, undoubtedly, while others were only 50 to 90 feet. My followers recognized in this acre trees belonging to the ipil, narra, legayan, and bugoc species. The largest tree on the acre was 35 feet in circumference above the buttresses; it probably belongs to the softer wood species.

To the westward of this place we visited a section of fine forest in which a Chinaman, some twelve years ago, had cut a great many logs.

After the logs were cut some trouble occurred with the Spanish Government, and he was not allowed to remove any of them. A few of them he had gotten near to the seashore, and we saw them lying in a creek in the water, mud, and hot sun. Some were partially decayed, but many others were in fine condition, which certainly speaks well for the staying qualities of those species, for surely no severer test could be applied. Among them was a piece of giam which my foreman remembered cutting twelve years ago when working for this Chinaman.

The piece, in spite of its twelve years of wet and dry, was as good as the day cut.

On Bongao Island we secured samples of giam, together with the unknown species of palambuyon, pisang-pisang, calung-calung, and surogtamban, all of which grow luxuriantly there, and are counted by the natives among their best trees. The samples taken are as follows:

Giam.—Height of tree, 55 feet 5 inches; circumference, 4 feet at base. The wood is undoubtedly hard (see Wood Exhibit No. 15), and resists the action of moist earth so well that the natives use it instead of molave. The pier at Bongao, now some 14 years old, is apparently as well preserved as the day it was put in. The piling is of giam cut in the neighborhood.

Palambuyon.—This tree grew in a partial swamp, with high buttresses, having a circumference of 6 feet 10 inches at the base. The height was 115 feet, with 33 feet to the first limb, where the circumference was 6 feet. In sawing, it showed that it was not so hard as molave or giam, but is greatly prized by the natives because, they claim, when put into the water or wet ground it hardens with age and never rots.

Pisang-pisang.—This magnificent tree species was quite plentiful, and is recognized by its thick, knotty bark and the straight, high-growing character of the trunk, which, in the tree taken as a sample (see Wood Exhibit No. 11), measured 90 feet to the first limb and 122 feet to the top. The girth at 6 feet above the ground was 6 feet, while at the first limb it was 1 foot 8 inches. The wood was fine grained, and cut like hard wood of the best class. The sapwood was white, the heartwood a beautiful deep yellow.

Calung-calung.—This tree undoubtedly belongs to the class of soft woods, though used much by the natives for boards and joists in house building. The only thing against it is the slight resistance it has against wood beetles. The sample secured (see Wood Exhibit No. 5) was from a tree 109 feet high, with a height to the first limb of 50 feet. The circumference at the base was 4 feet 3 inches; at the first limb, 3 feet 6 inches. The bark is smooth and light colored, with small black spots on it.

The limbs are not heavily leaved, and have large pink blotches on them, which aid in the identification of this tree.

Surogtanban.—A species peculiar on account of secreting, instead of a resin, a thick, odorous oil. It happened that we found the tree cut for a sample just before dark, and I arranged for the men to meet me there the following morning at sunrise in order to saw it down. They asked to be allowed to keep the saw over night, as one of them lived in the neighborhood, and it would save the trouble of carrying it to my house. I allowed them to take it, and the next morning, reaching the place at the appointed time, to my wonder I found the tree already sawed down, which must have been a work of some time, as the tree was large. The men were all there and gathered about the stump, into the center of which one of them was plunging a piece of bamboo and drawing it out covered with a thick, colorless, odorous oil. This was eagerly scraped off the stick and smeared over the naked bodies of the Moros—hair, face, and all—each one eager to put on all he could get. They said it made them well and strong and valiant in battle. The tree (see Wood Exhibit No. 7) had a height of 74 feet. To the first limb it was only 12 feet, where the circumference was 6 feet 4 inches. At the base it measured 7 feet 6 inches. The trunk when cut showed rings of oil. The bark was tough, smooth, and gray colored, mottled with white.

SIMONOR.

This island is of coral formation, and, though well wooded, none of the trees are large. On account of the frightfully sharp coral rocks everywhere it is impossible for the barefooted natives to get about. Near the shore we found, however, plenty of camagon trees, and cut a sample (see Wood Exhibit No. 10). The small amount of heartwood showed it to be very young.

BILATAN.

A rather large island, completely wooded, so far as we could judge. It also is of coral formation, and flat. The natives say the trees are large in the interior and many of them camagon.

SECABUN AND TANDABAS.

Two flat coral islands separated by a narrow channel and sparsely wooded, consequently they are capable of supporting 1,000 to 1,500 inhabitants each, who grow large numbers of tapioca trees, which supply the bread food of the Tawi-Tawi Moros.

To summarize the conditions of the Sulu Archipelago, we have:

1. The island of Tawi-Tawi represents three-fourths of the entire forests of the Sulu Archipelago. It is entirely covered, except the northwest and southeast corners.
2. The average height of timber trees is 100 feet.
3. The average number of trees over 3 feet in circumference is 45 to 46 per acre.
4. The best-known trees of the archipelago are teak, giam, ipil, narra, camagon, molave, bunloc, legayan, malabayabe, bugoc, calung-calung, dungon, surogtamban, pisang-pisang, palambuyon, guijo, legayan-bato, mangachapuy, camuning, legot, sandana, gutta-percha, balete, gatmon, ubal, cambantuli, saquil, coletapo.

SOUTHERN MINDANAO.

A study of the southern coast forests of Mindanao during my trips between the various towns, coupled with a lack of transportation and suitable white and native help, convinced me that even a superficial inspection of the forests of this region would take months, and was beyond, in point of time and equipment, the scope of my investigations; consequently I confined myself to a personal study of the forests in the regions southeast of Cottabato and along the trocha extending north from Tukuran while hunting for gutta-percha trees.

As already remarked, the forest-covered hills and mountains extend in unbroken parallel lines from a few miles south of Cottabato to Sarangani Bay. As I entered this belt from the north, or Rio Grande Valley side, south of the sultanate of Talayan, scattered clumps of trees were passed on the river banks even before we were obliged to leave the boats, but we had to push through miles of rank river grass, swamp bushes, and bamboo groves before the ground finally rose and the forest began. I was greatly disappointed to find that none of my Magindanao Moros knew anything about trees, and the Tiruray or Mountain Moros professed ignorance, probably through fear, of all but a few trees, and to these they gave names which, of course, had no connection with any other Moro name for the same trees.

It can be stated, however, that narra, ipil, molave, and camagon were easily recognized, and at least two species of calantas. The forest was mostly open, well watered, and in fine condition. The number of trees on an acre of this mountain side averaged between 45 and 50; their average height was rather great, certainly over 100 feet.

The forests spreading out to the west, north, and east from Tukuran have been cut into by the Spanish only in the near vicinity of the trocha. As active military operations were on during my stay there, I could not go far inland, but was able to go far enough to find apparently untouched forests where the trees were of fine growth, many measuring 16 to 25 feet in circumference. Here I counted 45 trees to the acre. By way of corroboration of the above figures I met an American carpenter at Cottabato, who told me that he had been a lumberman in America all of his life. I asked him if he had seen the forest about Tukuran, and he said that he had been from Tukuran to the northern coast and examined the forest carefully, as he was very much interested in the trees of southern Mindanao, intending to go into the lumber business later on. When asked if he could average the big trees per acre along the 50 miles of his travel, he answered, without hesitation, "Yes, between 40 and 45." The largest trees I saw were of soft wood, probably cedar species. There were also many large hard-wood varieties.

CONCLUSION.

The forests of southern Mindanao and the Sulu Archipelago cover a large extent of this country and are practically unexplored from a forester's standpoint. They have been cut into only at the most accessible points, and then only the very best trees taken.

The forests are not made up of any one kind of trees, but of an aggregation of several hundred species. There are comparatively few big trees to the acre, but many of those are very large, so that the number of board feet will probably average high. To determine the extent of the forests, the different species, and the number of each species, as well as their practical value, is undoubtedly a work of large proportions, but promises returns of great scientific and commercial value. My investigation simply showed many of the difficulties of the task and some of the methods of overcoming them. To get the best insight into these forests, with the least expenditure of time and money, I should suggest the purchase of a native sailboat capable of stowing away several tons of short log samples in her hold, and rigged Moro fashion, so that native crews can always be used to man her; the organizing of a collecting party to consist of two or more American foresters, assisted by the best Spanish and native forestry talent obtainable; the addition to this permanent staff in the different sections of the country visited of all the local help obtainable, and a valuable and scientifically prepared collection could be made in a short time with a minimum amount of risk and discomfort.

Nowhere did I find a forestry official with any wood samples in his office, nor the thought of making a collection of them. The most of them have good reason for not collecting in the forests, still samples of all the woods passing through their offices for exportation or local consumption, marked with the different names current in that section of the country, would help greatly in a short time to do away with the ignorance and confusion which prevail everywhere in the southern islands resulting from a multiplicity of Moro names for the same tree species.

For a summary of the timber business done in southern Mindanao and the Sulu Archipelago up to August, 1901, the reader is referred to the special report of Capt. George P. Ahern, chief of the forestry bureau.

From July, 1901, to February of this year, the books of the bureau show that 13 new timber-cutting licenses have been issued for Zamboanga, 6 for Cottabato, and 3 for Basilan, making a total of 22. As 4 licenses were issued previous to this time, and are still in force, the total number of licenses is therefore 26. During this period the timber cut has amounted to 13,881 cubic feet for Zamboanga, 11,547 cubic feet for Cottabato, 6,282 cubic feet for Basilan, and 612 cubic feet for Jolo. This gives a total of 32,212 cubic feet, with an average of 1,238 cubic feet for each license.

Among this timber is included the product of the one steam sawmill in this entire district. It is located at Zamboanga and supplies part of the lumber needed by the military post there. Needless to say, the output is not limited by the size of the mill, but rather by the number of logs which can be cut in the hills, dragged to the nearest waterway by carabaos and by hand, and floated to the mill.

Since the period above mentioned, the first American steam sawmill belonging to the Philippine Lumber and Development Company, of West Virginia, has sent out its first shipment of 5,000 cubic feet. Until it gets into full running order it can not be stated whether the mill can run under full capacity or must be subject to the limitations imposed by the Moro and Filipino workmen, carabaos, and the necessity of covering a large extent of ground in order to find the trees of the varieties now in demand.

Very respectfully,

PENOYER L. SHERMAN,
Inspector Forestry Bureau.

MARCH 7, 1902.

SECRETARY OF THE INTERIOR, *Manila, P. I.*

SIR: I have the honor to submit herewith a very interesting and valuable report of Dr. P. L. Sherman, inspector forestry bureau. Dr. Sherman has recently returned from an expedition through the island of Mindanao and the Jolo Archipelago, investigating the rubber and gutta-percha resources in those islands and the trade in said products. The report contains a description of the methods of extraction and preparation of the raw material, photographs illustrating the same, and, with his conclusions, forms a complete and instructive document which will aid materially in arriving at some plan for conserving these valuable products and regulating the trade in them.

From the above-mentioned report it is evident that it is but a matter of a few years when all the available gutta-percha trees in these islands will have been destroyed. This is inevitable unless decisive action is taken in the near future.

There are various phases of this problem which at first sight seem complex and difficult of solution, but on careful consideration one or more practicable solutions present themselves.

First. Measures necessary to protect the existing sources of rubber and gutta-percha, including the suppression of detrimental methods of extraction and preparation.

Second. The future development and expansion of the industry, including a gradual increase in area in new plantations.

Third. Methods of obtaining a revenue from the industry.

The following propositions present themselves, and with those submitted by Dr. Sherman, may lead upon full consideration to a practical solution of the problem.

PROPOSITIONS.

First. Forests, including rubber and gutta-percha trees, to be reserved as state property, to be directly administered, and the rubber and gutta-percha to be collected by the officials of the forestry bureau.

Second. Forests to be retained as state property, but private enterprise to be permitted over specified areas through terminable leases and strict conditions.

Third. Tracts of forests to be transferred to private ownership and development left to individual action under some degree of legislative regulation.

Fourth. Forests to be given to the first comer subject to more or less strict regulations as to methods of extraction and trading in rubber and gutta-percha.

Without entering into the merits of all these propositions, I respectfully invite attention to the advantages from almost every standpoint to be derived from following some plan based on the second proposition, namely:

The state to retain ownership and direct supervision. A lease of twenty or twenty-five years, with a prospect of renewal, would be an incentive to private enterprise to improve the area operated on; would give the parties some time to derive the benefit from new plantations. The timber cut out to make place for the new plantations would at least pay for the clearing. The revenue to the government could be made to bear a relation to the value of the products utilized and would increase in amount as the area was improved. At the same time the government land operated over would increase in value, these valuable products conserved, each plantation forming the center of prosperous and progressive communities, so that in time enough rubber and gutta-percha could be produced from these islands to satisfy a large part of the demand in the United States for these products.

At this time I would respectfully suggest that the trade in rubber and gutta-percha in Mindanao, Paragua, and the Jolo islands be stopped by forbidding the shipment of these products from these islands after, say, May 1. All rubber and gutta-percha brought in for a limited period after that date to be bought by the government and stored. That agents (white men) of the forestry bureau be stationed at three or more points in Mindanao, one at Tawi-tawi, and one at the present gutta-purcha shipping point in Paragua, Calasian.

These men could be authorized to purchase rubber and gutta-percha from such Moros or other natives as would collect these products under their instructions and supervision.

A botanical substation and laboratory could be established at some central point such as San Ramon farm, near Zamboanga, where rubber and gutta-percha plantations should be established at each station of the above-mentioned forestry agents.

There are no men at present in the forestry service in these islands with the necessary training and experience for the management of these stations. An application was received from Mr. A. M. Sawyer, at present assistant manager of a rubber plantation in the East Indies under the British Government, to enter our service as forester. He was fully informed by this bureau of the nature of our service, salaries, etc., and on March 4 cabled to this bureau that he would accept the proposition made by this bureau.

Mr. Sawyer is a graduate of Dehra Dun Forestry School of India, receiving several prizes on graduation for special excellence. I would respectfully recommend that this man be immediately employed.

During the present year a few men could be given the necessary preliminary instruction to inaugurate the work above outlined, and next year the bureau is confident of securing three or four men from Yale and Cornell forestry schools who have given at least one year to the study of rubber and gutta-percha, including the necessary laboratory work.

Very respectfully,

George P. Ahern,
Captain, Ninth U. S. Infantry,
Chief of Forestry Bureau.

Manila, P. I., *February 20, 1902.*

Capt. George P. Ahern,
Chief of the Forestry Bureau, Manila, P. I.

Sir: In accordance with instructions received from the forestry bureau I hereby respectfully submit the following report:

INVESTIGATIONS OF GUTTA-PERCHA AND RUBBER IN THE SOUTHERN PHILIPPINES.

Writers and dealers have long since declared that the entire territory which produces true gutta-percha includes only the lower part of the Malay Peninsula, part of Sumatra and Borneo, and the small adjacent islands of the Rhio Archipelago, etc. Java and Celebes, though very close on the west and south, have failed to produce even one gutta-percha tree of native growth, though the soil and climate are admirably suited to the same, as is shown by the wonderful growth and vigor of the gutta-percha trees planted under Dutch supervision in Java. The query naturally presented itself as to the eastern boundary of the gutta-percha zone, whether the spread of these peculiar trees stopped somewhere in eastern Borneo or whether it extended into the islands of the Sulu Archipelago and still further eastward into Basilan and southern Mindanao. The imports of Singapore[a] have shown for years that varying quantities of low-grade gutta-percha have found their way from southern Philippine ports into that city, and the statement was often made that still larger quantities were received at Sandakan, Borneo, for transshipment. But such is the secrecy employed by the Chinese of Singapore and Borneo, and so skillful are they in adulterating and coloring gutta-percha, as well as in changing names, that neither the quantity nor the quality of this Philippine gutta-percha is known to foreign buyers at Singapore, and certainly no gutta-percha is sold under any Philippine name.

To determine if the southern Philippines contained any true gutta-percha bearing trees, and if so, their species, location, and abundance, as well as to inquire into the methods employed in securing the gutta-percha and rubber now being exported from the southern Philippines, I left Manila November 11, 1901, and spent the ensuing three months visiting the islands and towns of the Sulu Archipelago and southern Mindanao, devoting most of the time to traveling and working alone among the natives, endeavoring in every way to establish friendly relations with them and allay the suspicion and even alarm with which they regard white persons who come among them and make inquiries into their pursuits, customs, and natural surroundings. I believe I was successful in many cases in gaining their confidence, and that the information they furnished me is as accurate as they themselves were capable of giving.

As a result of my investigations, I would divide the southern Philippines into two gutta-percha producing districts—first, the Sulu Archipelago; second, southern Mindanao—on account of their difference in species of trees, methods of collecting the gutta-percha, and ownership of the land.

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[a] See Sherman's report to the forestry bureau on rubber and gutta-percha in 1901.

FIRST, THE SULU ARCHIPELAGO.

(*a*) *Methods of collecting gutta-percha and rubber.*—With the view of going to the most western island of this group first, that is, going as near as possible to Borneo in order to begin my investigations, I went to our farthest military post, Bongao on Bongao Island, by steamer and from there tried by native boats to reach Sibutu Island, still farther to the westward. Every effort was unsuccessful, however, for the natives refused to take me in a sailboat at any price, alleging with good reason that during this season of light winds and strong currents no sailboat could hope to reach that island. The best information I could get was to the effect that no gutta-percha nor rubber was found there. If it is, it finds its way directly into Borneo ports and is unknown to the Moros of Tawi Tawi. At Bongao the natives from surrounding islands brought in small amounts of gutta-percha and rubber to sell to Chinese merchants, but upon being questioned they all declared most emphatically that they secured these products on Tawi-tawi and nowhere else. I secured three different grades of gutta-percha from these natives and one sample of rubber. To verify the statement that only Tawi-tawi contained gutta-percha and rubber, I made a trip of ten days' duration in a native boat, visiting the larger islands of Sanga Sanga, Seminor, Sekabum, and Tandabas, as well as many smaller ones, and in spite of continual questioning on the part of myself and my interpreter, we never found anyone to declare that any island but Tawi-tawi contained these products. After seeing these islands I felt convinced that they contained no suitable habitat for gutta-percha trees, as they were of coral formation, low-lying and small, while gutta-percha trees, judging from the varieties found in the Malay Peninsula, Sumatra, and Borneo, only do well at a somewhat remote distance from the sea and at an altitude of at least several hundred feet.

My investigations on the island of Tawi-tawi were as follows:

Starting at the southwest corner I first visited the very small village of Dajapatan. Here we found a small amount of gutta-percha in the dato's house, but the price he asked for it was so ridiculously high that I concluded he thought I was a curio hunter and ought to pay accordingly. The natives of the village said they did not collect much gutta-percha or rubber, as they had to go two days into the mountains in order to find it, as all the trees near them had been cut down. Leaving Dajapatan we sailed to the next village, called Balambing, some 10 miles along the south coast. Since the destruction of Tataan, on the northern coast, by the Spanish in 1898, Balambing has been the only town left on Tawi Tawi, and here I found that a considerable number of the people gained a living by gathering rubber, though they would not admit they gathered gutta-percha as well. When asked to show samples of their rubber they would remove a piece of the flooring of the room, draw up a concealed string, and display several large balls of rubber which had been floating in the sea-water below. When asked why they kept the rubber in the sea-water they replied that it made the rubber harder and better, but my guide, who also knew the fine points of rubber collecting, added that it was also because it kept the rubber full of water and hence prevented loss of weight. This rubber seemed of an excellent quality and identical in every way with the best Borneo rubber. The natives said they secured it from large vines that grew in the forests on the other side of the mountains. The sample I bought through my Chinese guide weighed about 115 pounds and cost 50 pesos. As I was offered this amount as a first price by a Chinese buyer on my arrival at Jolo, I concluded it was probably worth to him some 75 or 85 pesos a pico of 133 pounds and he would sell it for 100 to 125 pesos in Singapore. Closer than this I could not approximate for reasons that will be seen later.

As the people of this town were not very friendly, and I had good reason to believe they were intent on deceiving me as to the location of the best rubber district and their method of getting into it, I decided not to try to penetrate into the interior of the island from here, but to go farther eastward. Accordingly I went to Buan, situated in the middle of the island on the south coast. This village contains but a half dozen houses, but the old dato at its head was very friendly, and, besides giving me much information about gutta-percha and rubber, he let me have a boat, and ordered some of his followers to show me some gutta-percha trees and rubber vines, and to cut them down and secure the rubber and gutta-percha for me. We accordingly set out at daylight the next day, the small boat enabling us both to enter the shallow water along the shore and to paddle a long way into the mangrove swamp. From here the land rose abruptly and a forest of magnificent trees began. After a steady climb of several hours the Moros began the hunt for gutta-percha trees, for although most of them had been cut down in this locality, they said, "Still anyone who had enough luck could always find one or two." The first tree we found was 63 feet high and rather slender, but as it was in flower and fruitage, I told the Moros I wanted the gutta-percha from it. To secure this they produced a small chisel-axe and proceeded to cut down the tree. When felled they at once ran to the top of the tree and with a chisel proceeded quickly to cut a ring in the bark entirely around the trunk. Just here a big altercation arose, for in my haste to see the Moros work I started to climb over the fallen tree instead of going around. They protested vigorously against my climbing over, alleging that the milk would not flow if anyone climbed over the tree. When the ring was made in the bark, as above described, a cocoanut shell was placed underneath the tree and at once the gutta-percha milk began to run down and drop into it. In a like manner they ringed the trunk at a distance of every 2 or 3 feet from one end to the other, under each ring placing a cocoanut shell. While waiting for the flow of milk to cease we secured samples of the flowers, fruit, and foliage of the tree. In shape the leaves resemble Dichopsis gutta (the best gutta-percha species), but the characteristic bronze color of the under part of the leaf was lacking and the fruit was dissimilar both in color and shape. The milk as it ran from the tree was much slower in coagulating than the milk from Dichopsis gutta, and when coagulated the product was more elastic. I saw nothing like this species of tree in Singapore or Java, and it will probably be found to be a new species of the genus Dichopsis. After half an hour the flow of the milk almost ceased, so the Moros scraped the milk that had partially coagulated on the trunk into the shells, poured the milk from a dozen and a half shells into one, inverted another half shell over it to serve as a cover, cemented the edges with mud in order that no milk should spill out during the journey, put shells and ax into the basket, and announced that they were ready to hunt another tree. This we found with a half hour's tramp, and it proved to be over a hundred feet high and of the same species. As I needed more milk for a sample, I ordered this one felled, and exactly the same process was repeated, the Moros alleging, however, that I need not expect much milk, as it was noon, at which time the milk returned to the roots of the trees. To get the most milk they said the tree should be cut at daylight or sunrise. When asked whether the rainy or dry season was the better for cutting down the trees, they answered that you should choose the season in which you were luckiest, for without luck you could not find any trees, and even if you did they would have no milk in them. Inquiries as to the best place for finding gutta-percha trees elicited the reply that the farther you went back into the mountains the more trees there were; in fact, there were gutta-percha trees everywhere in the interior. All efforts to get them to find any other kind of gutta-percha tree failed, as they maintained that although there had been another kind it was never seen nowadays and was of inferior quality. During our tramp in search of rubber vines we came upon the partially decayed trunk of a large tree which had been felled and ringed, and this the Moros claimed was of an inferior kind which gave much milk and was good to mix with the best kind so as to increase the weight and fool the Chinese who bought it.

The rubber vine which we found was twisted around on the ground for a considerable length and then ascended a high tree. The bark was black and very rough, and on being tapped with a bolo gave a quick flow of milk, which ceased almost as soon as it began and coagulated on a minute's standing, or quicker through stirring. In fact, though the leaves were larger than those of Willughbeia firma, and the bark somewhat rougher, the rubber resembled the product of this species very strongly and should compare favorably with the best grade of Borneo rubber. To secure the milk from the vine, my Moros jerked most of the vine down from the tree and tapped it with a bolo in many places, arranging their cocoanut shells so that what milk did not coagulate on the bark would run into them. When the milk had ceased to flow the coagulated strings of rubber were pulled from the bark, thrown into the milk in the shells, and all worked into a solid mass of rubber very elastic and quite tough and hard. Near by the Moros showed me a rubber vine which they had tapped the year before. It was lying along the ground and, though not cut through in any place, was dead. I surmised that death had resulted both from mutilation and inability to climb back to its former position in the sun and light. This method is therefore even worse than that used in Borneo, where the natives cut the vines into short pieces and let the milk drip from them into a pan. In that way all the milk is secured, while in Tawi Tawi the vine is killed and the greater part of the rubber is lost as well. The Moros knew of no other kind of rubber vine.

Returning to Buan, the natives took the gutta-percha milk from the shells and proceeded to heat it in a saucepan over a fire until it coagulated, forming a soft, plastic mass. This they put on a board and kneaded with cold water until cold, when they put it aside to harden.

I continued my journey around the entire island of Tawi Tawi in search of other towns, or even scattered houses, where I could gain more information on the subjects under investigation, but neither on the eastern nor northern coasts could we find a single Moro habitation. In Tataan, on the northern coast, where there was a thriving Moro village during Spanish times, not one house is now standing. Near the site of this town, however, we found some half dozen Moro boats anchored in a little cove, and the women and children in them told us they were from Balumbing, and that the men had gone into the forest to gather rubber. This confirmed my suspicion that the people of that town intended to deceive me when they said they always went into the mountains by land and walked three days before reaching the rubber region.

(*b*) *Ownership of gutta-percha forests.*—All during my stay in Tawi Tawi, and also in Jolo before I went there, I was told repeatedly that the sultan of Jolo claimed to be not only the owner of the land and its forest products, but had some years previously positively forbidden the taking of either gutta-percha or rubber from the Tawi Tawi district. His friends said it was because the sultan wished to prevent the destruction of the trees, but the Moros of Tawi Tawi affirmed that it was due to his desire to secure all the profits of gutta-percha collecting for himself. The practical result of this restriction seems to be (1) that few Moros engage in gutta-percha collecting compared with those who undoubtedly would have gone into this work had it not been forbidden by the sultan; and (2) the trees are not saved from destruction, for it is the custom of the sultan, when needing money, to go to Tawi Tawi or an adjacent island, and order out all the people of a town to hunt gutta-percha and rubber. As a considerable force of men turn out, and orders are emphatic that they work hard, the result is that a large amount of gutta-percha is brought in. which the sultan sells to an accompanying Chinese merchant, giving a small portion of the proceeds to the Moro collectors, but keeping the lion's share for himself. The dato of Buan told me the last time the sultan was there the Chinaman gave the sultan 500 pesos for what they collected, and the sultan gave 100 pesos to them for the work, keeping 400 pesos for himself.

In connection with the ownership of the gutta-percha and rubber forests, mention should be made of the contract now in force between the sultan of Jolo and the Schuk Brothers of Jolo, by virtue of which the latter claim the exclusive privilege, among other things, of collecting gutta-percha and rubber in any of the islands of the Sulu Archipelago. So far I understand they have only cut wood under this contract, but should the present conditions not continue, the validity of this claim would probably have to be taken into consideration. So far as I could discover, all gutta-percha which the sultan or the Moros collected is purchased by the Chinese in Bongao, Siassi, and Jolo, and is shipped by them to Sandakan and Singapore. As they always work together in their trade dealings and barter cloth and other articles with the Moros, there is no such thing as a market price for gutta-percha or rubber in any of the towns of the Sulu Archipelago.

SECOND, SOUTHERN MINDANAO.

(*a*) *Geographical distribution of rubber vines.*—Contrary to expectation, I was unable to gather any definite knowledge in regard to rubber vines in Mindanao. Neither the Moros nor the Chinamen in the various towns had any rubber for sale, nor had they ever handled it. In one place in Cottabato only, a Chinaman told me that he had heard it was found in central Mindanao, and this confirms the statement made by Major-Surgeon Porter, of Malabang, who, while traveling in the interior, observed that the drumsticks of one forest tribe of Moros were tipped with rubber. Beyond these two statements I found nothing further to report on this subject.

(*b*) *Geographical distribution of gutta-percha trees.*—Treating all southern Mindanao as a whole, the central point of the gutta-percha trade is Cottabato. This being the regular port of call for several Sandakan and Singapore ships, as well as the geographical center of the south coast and Rio Grande Valley region, all the gutta-percha is collected here, and sorted and packed for exportation.

The towns and villages along the coast, west and east, from whence the gutta-percha is shipped to Cottabato, can be easily enumerated and are, mostly, accurately given by the maps; but to name and even approximately locate the forest lands of the interior (gutta-percha never being found directly on the coast) from which these various towns secure their gutta-percha, is difficult, as all of the maps are inaccurate, and most of them positively misleading. I append a table showing the principal towns which supply Cottabato with gutta-percha, and the names of the forest regions from which it is taken.

List of names of towns and forest regions from which gutta-percha is sent to Cottabato.

Central point for collection and exportation.	Point of collection.	Name of forest regions.
Cottabato	Turkuran and Dinas	Dinas-Subano. Camalarang. Labangas. Tukuran
	Malabang	Laguna de Lanao. Baras. Liangan. Segayan.
	Glan, Serangani, and Binang	Tagabuli. Manobo. Bilan. Binang.
	Reina Regente and Salaya	Dama Balao. Matingauanan. Talayan.

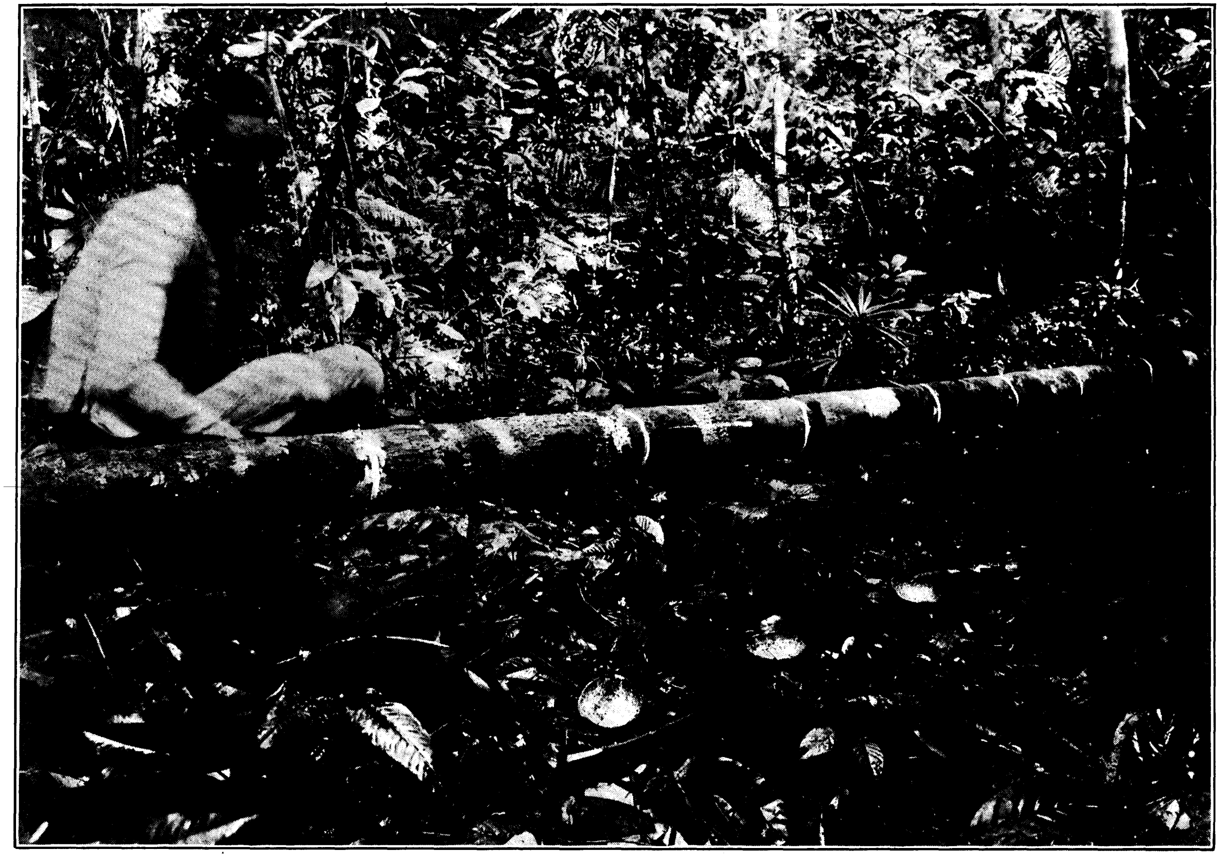
I was greatly surprised to find the extent of country covered by these trees. In fact, the natives say, and no one has yet shown to the contrary, that all of the mountain region of southern Mindanao contains gutta-percha. Much, of course, has never been explored by Americans, and much also is never visited by gutta-percha collecting natives. Still, these trees have been found stretching out in all directions through the forest belts of the interior as far as anyone has gone, and only time and much exploration can determine their true extent and number. The very fact that gutta-percha is being collected from almost as far as Zamboanga on the west to Davao on the east gives proof of the extent and amount of these trees; and in none of the towns which I visited on the south coast did I find Chinese or Moros who were not engaged in the gutta-percha business.

(*c*) *Methods of collection of gutta-percha.*—A study of the Cottabato market showed that there are at least three kinds of gutta-percha coming in there; that arriving from the various coast towns coming in small quantities in native boats, while that arriving from the great region drained by the Rio Grande comes in large shipments and is all controlled by Dato Piang. In fact he has a Chinese agent in Cottabato who handles most of what he sends in. It seems that this gutta-percha monopoly, so to speak, needed investigating most of all, especially as the Chinese merchants assured me that Piang never allowed any trees to be cut down nowadays, but secured the gutta-percha by tapping according to forestry regulations. Accordingly, through the kindness of the military authorities and friends of the dato, I produced the amount of pressure necessary to secure me a cordial invitation from the dato to visit the forests south of his rancheria in order to see live gutta-percha trees for myself. Consequently I left Cottabato on January 21, going up the Rio Grande to Piang's ranchería at Kudarangan. Here Dato Piang met me and fitted me out with a boat and a large crew of Moros, sending another boat ahead to warn the people I was coming and to have some gutta-percha gatherers ready to take me into the forest when I had gone as far as possible by boat. Just as I was leaving Piang I asked him if we had an ax with us in case we wanted to cut down a gutta-percha tree to secure a sample, but he called back without a moment's hesitation that no ax was necessary, as the natives knew how to tap the tree with a small bolo. The journey upstream took two days, even with three polers and six paddlers working hard. Our general direction was southeast and then southwest. After we had arrived at the headwaters of the west branch of the Rio Grande we struck inland for half a day, where we were met by six natives of the Tiruray tribe, which inhabits the forests and mountains of the coast range southeast of Cottabato. They had come to meet me by order of Piang, and with them and my boat's crew we pushed into the forest for a day and a half before finding a gutta-percha tree. The first tree when found proved to be of the best variety, according to the Tiruray, and of good size. Telling them that I wanted a sample of the gutta-percha from the tree, they produced a chisel ax almost identical with the one I had seen used in Tawi-tawi, and proceeded to "tap" the tree in one place so effectively that in about an hour it toppled and fell. We found its length to be 135 feet, its circumference at base 5 feet 4 inches. The Tiruray then produced bolos and proceeded to cut rings in the bark—not so that the bark was cut off, but rather so that it was cut into small pieces. The gutta-percha milk at once flowed out, and the chipped-up bark absorbed it sponge fashion. In this way but little escaped and ran down to the ground. Owing, however, to the size of the tree and the force with which it fell, the under third of the bark was imbedded in the ground, and hence could not be tapped at all. After waiting for about an hour the milk ceased to flow, and had so far coagulated that the chipped-up bark and adhering gutta-percha could be pulled off and worked molasses-candy fashion, so that all except the finest particles of bark fell out, leaving an elastic, tough mass of gutta-percha, which was molded into sausage-shaped pieces and left to harden. When asked whether the early morning or midday was best for tapping the trees they said midday, which was exactly the opposite of the observations made at Tawi Tawi by the Moros. The leaves of the tree were of a copper color below and green above, and while the general shape and appearance of the leaf showed it to be of the genus Dichopsis, still the intense color of the underside, as well as the too pronounced veining indicated that it was neither Dichopsis gutta, borneense, nor Oblongifolium, nor could I identify it with any of the Singapore, Sumatra, or Java species. The tree was growing on the mountain side, some 50 feet above the waters of a small mountain stream. The soil was rocky and the roots buttressed heavily and high above the ground.

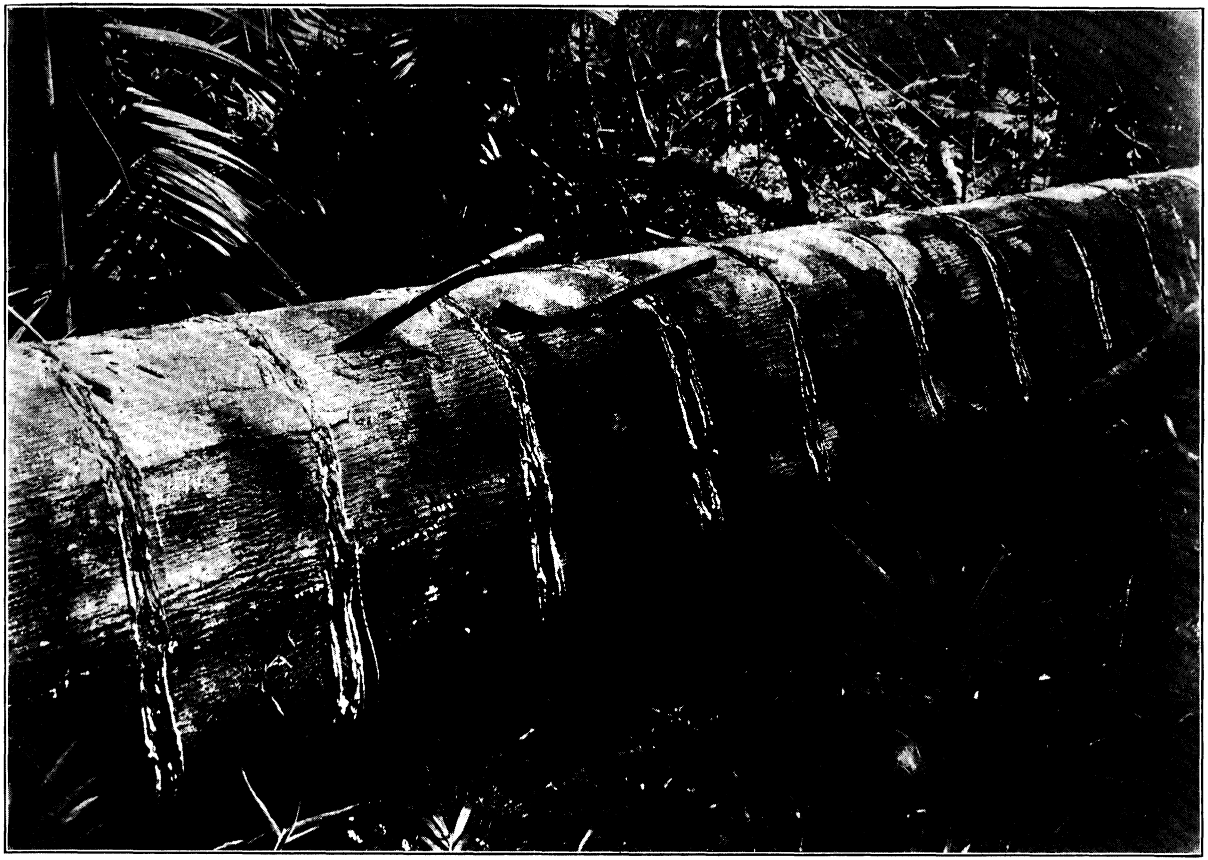
I tried to get the natives to find some of the seedlings of this tree, but on account of a superstition or some unknown motive they at first refused to look, and when I insisted they obeyed mechanically, but brought back nothing. I finally had to make them all turn out again, and by offering a reward for each seedling we succeeded in finding fourteen during an hour's hunt. These I pulled up, and by careful packing brought them back to Cotabato and kept them in good condition for a week, when I had them planted in a private garden where they could be cared for and watched. During our hunt for these seedlings we found a seedling of another gutta-percha species, the leaves of which were large, veins pronounced, and copper color on under-part of leaf of greenish tinge. I asked the Tiruray whether they found trees of this species, and they said it was very rare, but sometimes found over on the second range of mountains from us toward the coast. They had not seen a tree for a long time until just before they had started to come to meet me, and this they had cut down and the gutta-percha they had secured was now in their house down in the valley. This gutta-percha I eventually secured on my return trip, finding it, however, to be of inferior quality. A third species of tree they said was often met with, so I ordered them to find one. By scattering in all directions they succeeded in doing this the next day, and we went to it, cut it down, and secured the milk as before. In this case, however, the milk coagulated slowly and was very sticky. The Tiruray were, however, equal to the emergency, and, after making a fire, proceeded to fashion a saucepan out of a piece of green bark. By warming the mass of sticky gutta-percha milk and adhering bark in it until thoroughly steamed the milk coagulated and the stickiness ceased, upon which the chipped-up bark was shaken out and the resulting gutta-percha packed away in a piece of fresh bark to harden. This kind of gutta-percha the Tiruray consider of third quality, and I infer that they use it to adulterate the better kinds. The leaves and general appearance of the tree were similar to the Tawi Tawi species, though the behavior of the gutta-percha was different.

On my return to Cotabato the commanding officer informed me that the day before I arrived he had received a pious letter from Dato Piang, filled with righteous indignation because he had found some Tiruray to the south of his rancheria—i. e., where I then was cutting down gutta-percha trees contrary to his orders; that he had confiscated the gutta-percha and was holding it subject to the command of the major. This of course was an effort to forestall the bad effects which he feared might result from my journey into the gutta-percha forests, as he well knew that my experience there would effectually disprove his long-standing assertion that none of his gutta-percha came from trees cut down.

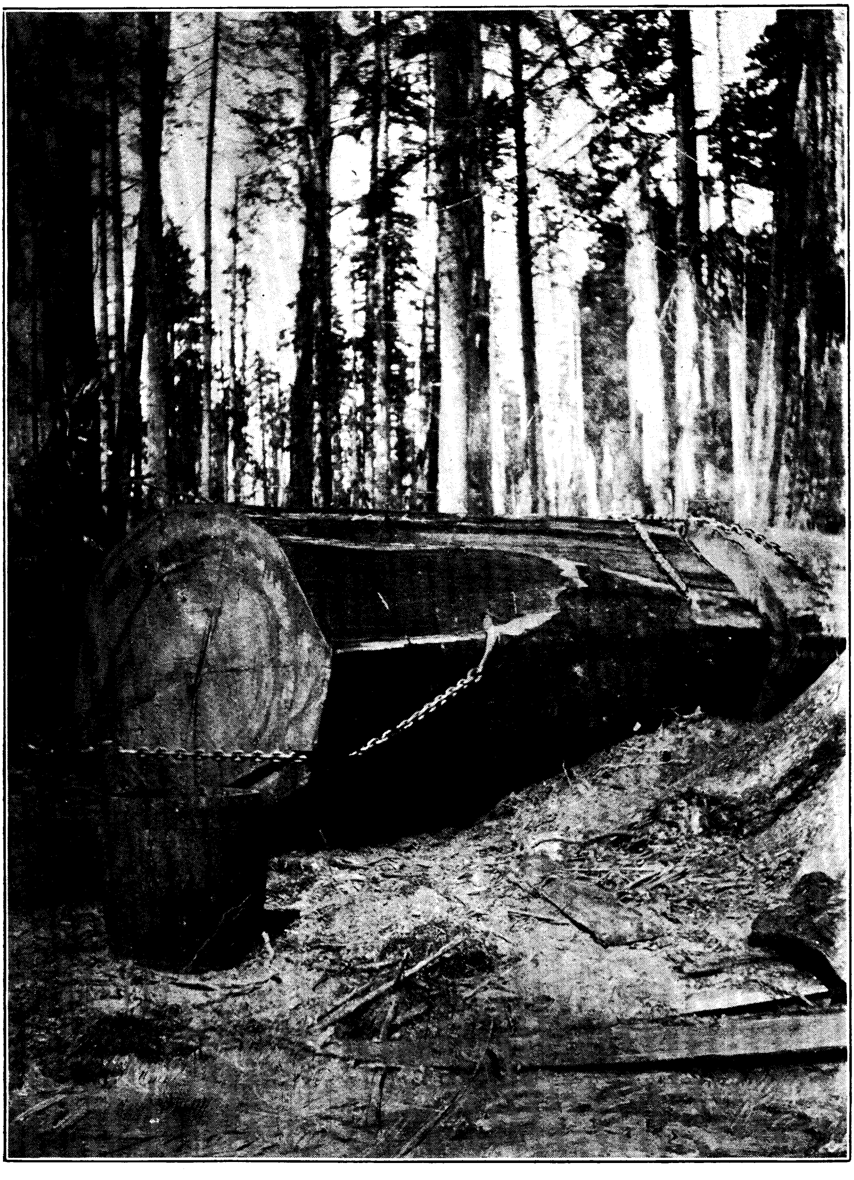
From Cotabato I went to Tukuran, and from this place made two trips in search of gutta-percha trees. The first was to the west along the coast, from which I expected to ascend a river and then strike into the mountains, but as the water in the river was too low for the boat and the mangrove swamps on both sides prevented walking, we gave up the attempt and returned to Tukuran to enter the forest from the trocha, which extends from there to Misamis on the northern coast. As an active military campaign was then on against some hundreds of renegade Filipinos and Moros, who were trying to cross the trocha through the best gutta-percha region (Subano), we had to limit our investigations to the vicinity of the trocha, but were lucky in discovering a very large gutta-percha tree some 5 miles inland. On my asking my Tiruray and Moro followers to get the gutta-percha for me, they cut the tree down and ringed it in a manner similar to that used by the Tiruray on the Rio Grande. The milk being much more abundant, however, and coagulating more slowly, much was lost by running to the ground. The part remaining absorbed by the chipped-up bark was scraped into balls, wrapped up in big leaves and carried back with us for cleaning. This tree measured 159 feet 5 inches in height and 8 feet



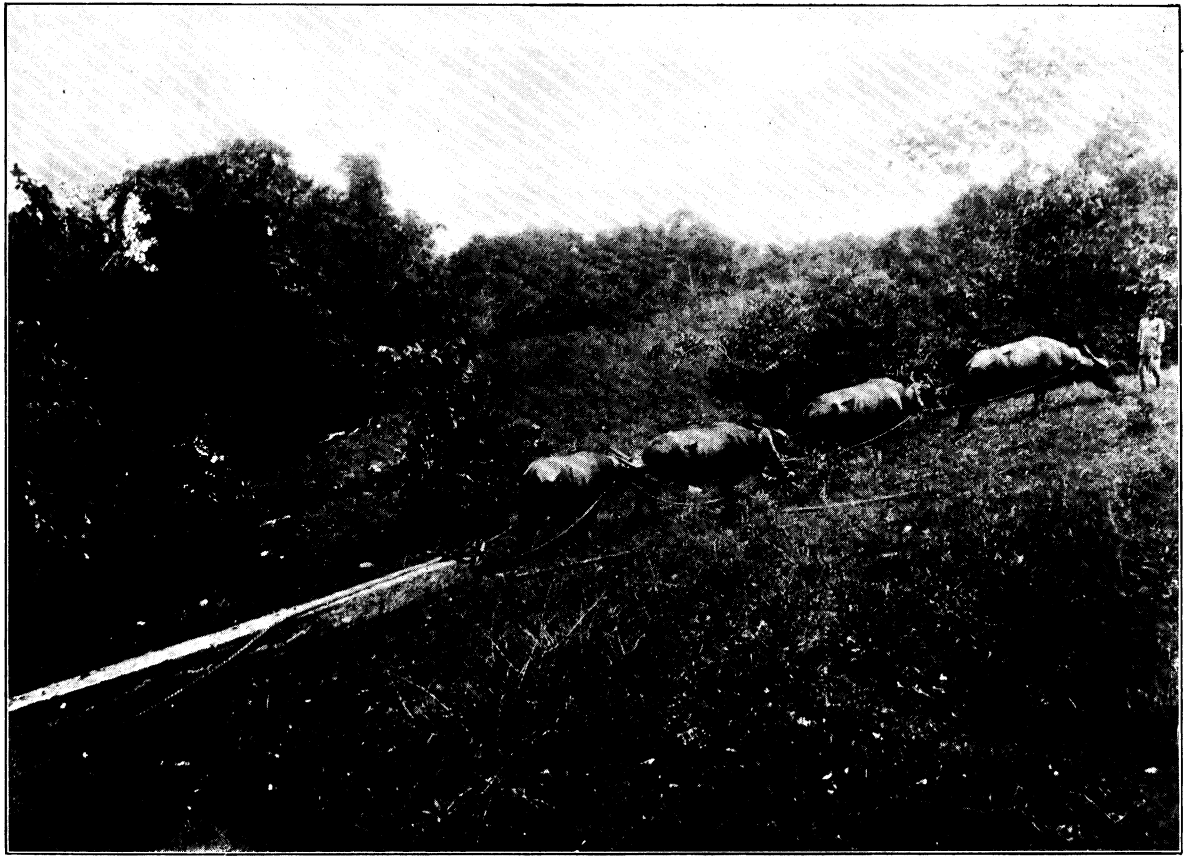
SCENE ALONG THE OLD SPANISH TROCHA NORTH OF TUKARAN, MINDANAO, WHERE GUTTA-PERCHA TREES STILL GROW. A GUTTA-PERCHA TREE FELLED AND RINGED BY THE MOROS OF BUAN, TAWI-TAWI. THE MILK RUNS INTO THE COCOANUT SHELLS ON THE GROUND.



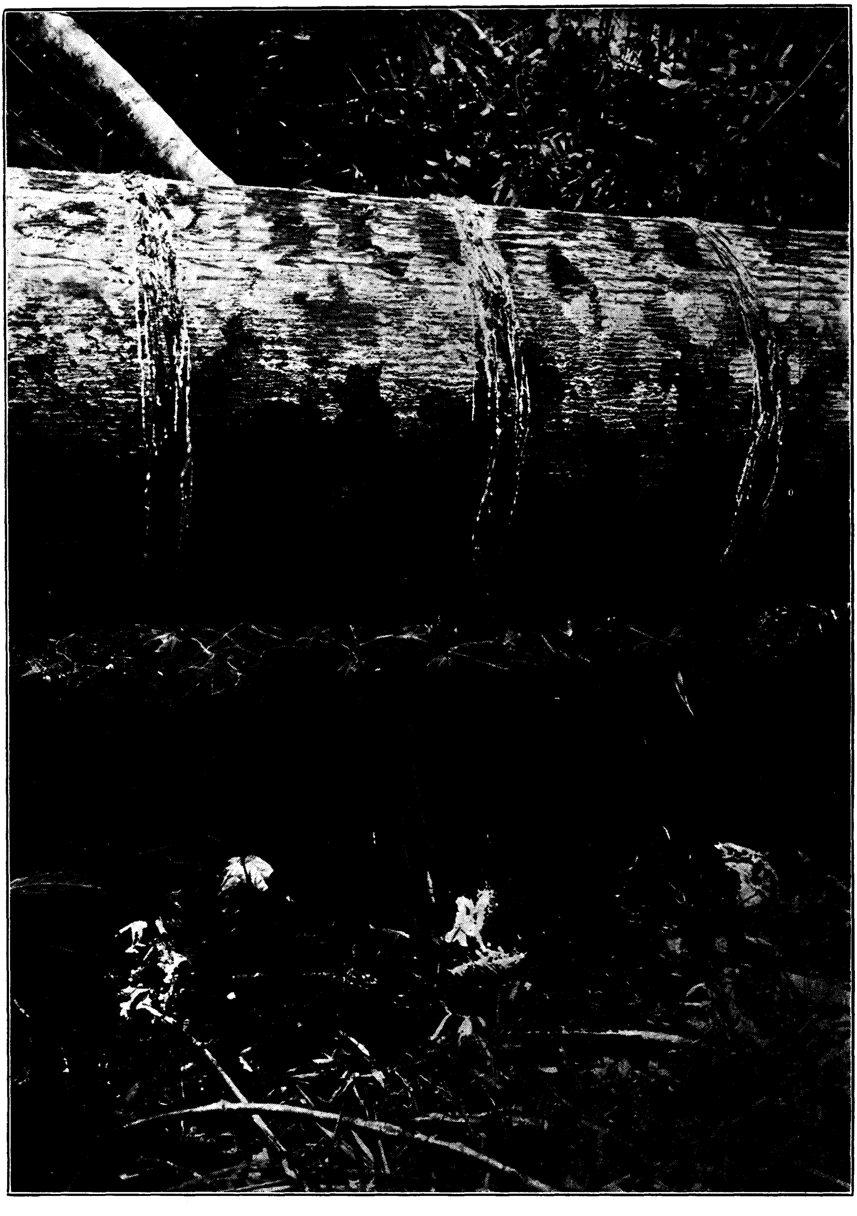
GUTTA-PERCHA TREE FELLED AND RINGED IN SUCH A WAY THAT THE MILK WAS ALL ABSORBED BY THE CHOPPED-UP BARK AND NONE ESCAPED TO THE GROUND. THE TWO BOLOS WERE USED FOR MAKING THE RINGS.



LOGS HAULED BY "DONKEY" ENGINE AND CABLE, SHOWING METHOD OF "HOOKING ON," CRESCENT CITY, CAL.



FOUR CARABAOS SKIDDING LOG 30 FEET LONG AND 12 INCHES SQUARE.



GUTTA-PERCHA TREE FELLED AND RINGED IN SUCH A MANNER THAT A GREAT PART OF THE MILK WAS NOT ABSORBED BY THE CHOPPED-UP BARK. IT RAN DOWN TO THE GROUND AND WAS LOST.

3 inches in circumference at the base. It was some 88 feet to the first limb. The leaves were similar in appearance to the second tree which I found in the Cotabato region and the behavior of the gutta-percha seemed the same. On our return to Tukuran the natives built fires and warmed up the gutta-percha with water until completely coagulated and very soft, upon which they kneaded it with feet and hands until most of the bark was knocked out. It was then cooled and hardened in sea water. This process they claimed was that used by the natives of the Subano district lying northwest of Tukuran and from which the cleanest gutta-percha comes. After being dried the weight of the gutta-percha from this tree was 9½ pounds. Had the trunk fallen so that it could have been ringed entirely around, and had precautions been taken to catch all of the milk which was lost on the ground, we should certainly have secured 20 pounds. How much still remained in bark and leaves can only be guessed, but on the basis of the calculations given by V. Romburgh and others it probably totals 150 or 200 pounds.

At Tukuran I secured a fine sample of the best Subano gutta-percha, which the Filipino dealer said was worth $80 Mexican per picul in Cotabato. At Malabang and Parang, Barang, which I visited, there was no gutta-percha gathered within many miles. All that came in there for shipment to Cotabato was from the great Lake Lanao region, into which no American can go at present. The gutta-percha seen here was identical in every way with that already secured, and I did not deem it worthy of special study. The same will also apply to that coming into the little villages along the coast between Cottabato and Sarangani Bay, convincing me that at the present time the principal part, if not all, of the gutta-percha now being gathered comes from two or three varieties of trees, specimens of which I had seen and secured.

(*d*) *Market prices and values.*—From personal observations and information it appears certain that the real gutta-percha gatherers all belong to the mountain or pagan tribes of southern Mindanao, and they exchange the gutta-percha for cloth and weapons with the lake and river (Mohammedan) Moros, or visiting Chinese traders, who in turn sell it to the Chinese firms in Cotabato for exportation to Singapore. The system is well organized in spite of the fact that the gutta-percha business has only developed since the American occupation, probably because the instigators and promoters, buyers, and monopolizers of the whole thing are the Chinese. They get advices from Singapore as to prices, and then determine the price they will pay the middlemen—Moros—and that in turn, of course, fixes the price the gutta-percha gatherers themselves finally receive.

To find out the prices paid for the gutta-percha as it changes hands was very difficult. I know the Chinese in the various towns deceived me as to the prices they paid; and as most of the mountain tribes were paid in cloth and weapons, it was equally hard to fix their profits. During my journey up the Rio Grande region we came to the house of a dato, who acted as buying agent for Dato Piang in that part of the country. In his house I found quite an amount of gutta-percha which he said he had bought from the Tiruary for 3 pesos per basket. On this basis I figured the price of the picul to be ten or fifteen pesos. I offered him 8 pesos for two basketfuls, and he gave them to me for that price upon my promising not to tell Piang. Corroborative evidence that the Tiruray and Manobos receive about this price, both from Piang and the Chinese traders who visit the coast towns between Cotabato and Sarangani Bay, is offered by Lieutenant Van Horn, who during his trip through that part of the country had occasion to observe the amount of cloth paid for a picul of gutta-percha and figured it to be ten to twelve pesos in value.

It must also be explained that in using this word "picul" it stands for 133 pounds when gutta-percha is shipped to Singapore, or when weighed to sell to an American or foreigner, but 162½ pounds when the Chinese buy from the Moros. This practice may not be universal among the Chinese of all the towns, but it is certainly true for Cottabato, and the adjacent towns, which represent 80 per cent of the gutta-percha trade. Thus the Chinese gain 29 pounds by weight during the process of buying and selling. A native (Filipino) buyer in Tukuran told me he made his picul weigh only 150 pounds. I can see no possible excuse for this process of cheating ignorant natives. Of a market price for gutta-percha in Cottabato or in surrounding towns there is practically none. As everything is entirely in the hands of the Chinese they fix nominal prices for different grades of gutta-percha, in order that there shall be no excuse for the forestry bureau officials to collect a high export tax (forestry tax), but as soon as anyone tries to compete with them in buying from the natives up goes the price at once, and the outsider is still on the outside.

A forestry tax, therefore, that is made on the market price of gutta-percha in Cottabato, or in any southern port, has but a precarious foundation. The forestry tax collected in Cottabato was 7 pesos per picul for first class, 4 pesos for second, and 3 pesos for third class. The classification is, however, entirely in the hands of the Chinese themselves, as none of our forest officials in the southern ports know anything about gutta-percha, and in fact it is not made according to the intrinsic value of the gutta-percha itself, but rather on account of the amount of dirt and bark it contains, which, of course, is an entirely wrong basis of calculation. Such large amounts of gutta-percha were being shipped as second and third class, when they certainly should have been first and second class, that after a consultation between the forestry official of Cottabato, the collector of customs, and myself, we decided on February 1 to tax first-class gutta-percha 7 pesos per picul and second-class 5 pesos, doing away with third-class entirely. While this arrangement is still open to objections, it will save the government thousands of dollars, which it is now losing, until a new scheme can be devised. To be effective it must be general for all Philippine ports, as already the Chinese of Mindanao have hit on the scheme of shipping gutta-percha to Jolo, looking for a forestry official who will fix a lower price, and hence collect a lower export tax.

CONCLUSION.

From all testimony which I could gather—Chinese, Moro, and among the resident Spanish—it appears that gutta-percha was discovered at least ten or fifteen years ago in various places. The Chinese were the ones who sent it to Singapore, and probably a big export business would have resulted had not two things happened to ruin the enterprise. One was that several of the largest Chinese dealers lost heavily in gutta-percha for one reason or another, and thus scared all the rest. This and the vexatious forestry regulations made by the Spanish at that time completely killed the gutta-percha trade, and it did not revive until the American occupation of the southern islands. It is due to this cessation in the gutta-percha business that we have trees left at present. How many are still standing can not be estimated, though the information I received leads me to the conclusion that there are a large number.

The true gutta-percha gatherers of the Tawi Tawi district belong mostly to the tribe called Samales, while those of Mindanao embrace all of the forest tribes from Zamboanga to Davao. Their only method of collecting the gutta-percha is by felling the tree. I do not see how they can be instructed in any other method, or that they are amenable to forestry regulations. Their whole method of living and low grade of civilization are against almost any kind of instruction.

The chief gainers by the whole gutta-percha business are the Chinese merchants of Siassi, Jolo, and the ports of southern Mindanao, especially Cottabato. They are practically hiring whole tribes of natives to cut trees for them and bring in the product accruing from the destruction of the same, yet they do not take out forestry licenses, but rather violate the present forestry laws with impunity. They are undoubtedly dealing unfairly with the natives in the matter of weights, and unfairly with the government in the classification of the gutta-percha, and consequently in the payment of the forestry tax. Should the present forestry arrangements be continued, however, a white forestry official, who has a knowledge of gutta-percha and rubber, would do much to counteract the present evils existing at Cottabato and Jolo.

The intrinsic value of the gutta-percha now growing in the southern islands can only be settled by careful chemical analysis and the proper physical and electrical tests. The samples collected represent both the pure products from the different species of gutta-percha trees and the different commercial products now being shipped to Singapore in large quantities. The necessary analyses and tests can be made in Manila or in Singapore.[a] Should the tests show that the gutta-percha is of the standard required for submarine cables, and hence of international importance, and worthy of being controlled by the government, then apparently three courses are open:

(*a*) To continue the present plan of allowing the forest tribes to gather the gutta-percha by felling the trees, but prohibit the sale of the product to anyone but the government, a fair price being paid for the same and directly to the gutta-percha gatherers themselves. In this way a large amount of gutta-percha might soon be collected, but the forests would, of course, be ruined for half a century or longer.

(*b*) To prohibit the cutting of trees or the sale or exportation of gutta-percha by individuals. Forestry officials can easily instruct native workmen in the methods of tapping the trees, and they can go into the forests in gangs and could undoubtedly secure a large amount of gutta-percha all the year round without harming the trees. There being so much coast line and deep-river waterways in southern Mindanao that supplies could easily be sent in and the gutta-percha taken out. This plan could be carried out in connection with a botanical garden substation in southern Mindanao, in which the various species of gutta-percha trees can be grown and instructions given to native forestry officials and workmen in the best methods of securing gutta-percha.

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[a] Mr. E. E. Steele, the Singapore representative of the Silvertown Essex Cable Company, of England, is well qualified to act as analyst.

(*c*) To prohibit the cutting of gutta-percha trees without taking an active part in the extraction of the gutta-percha. The government could prohibit, under penalty of confiscation and fine, its sale or exportation. The isolated position of the Philippines would render it comparatively easy to prevent the smuggling of gutta-percha to Borneo or Singapore, and without a market the gathering of the same would soon cease.

The number of species of gutta-percha trees, as well as the great extent of country containing them, shows conclusively the ideal conditions which Tawi Tawi and Mindanao present for the growth of these valuable and fast disappearing trees. Many of the places I visited certainly equalled or rivalled the sites chosen by the Dutch and English for large plantations of gutta-percha trees in Java and Singapore. The soil, climate, and natural conditions generally seem all that could be desired. A forest reserve into which several hundred thousand seedlings of the best Borneo species were transplanted, in case our own species proved unsuitable, would in a few years make the United States sure of all the gutta-percha necessary for her submarine cables and independent of all threatened Dutch monopoly in the future.

An effort to collect the statistics of the gutta-percha and rubber trade in the Philippines since the American occupation has met with only slight success. The number of licenses granted by the forestry bureau, allowing these products to be collected, as well as the amount of forestry charges collected on the same, is to be found in the special report of Capt. George P. Ahern, chief of the forestry bureau. An inspection of the custom-house reports shows that up to the time of the establishment of the forestry offices in the southern Philippines, nothing under the name of gutta-percha or rubber was exported, but nearly 350,000 pounds of "copal" and "other gums." How much was gutta-percha or rubber it is hard to say. Since July, 1901, when forestry officials took charge in the southern islands, up to February, 1902, there have been issued but six licenses for collecting gutta-percha and rubber, showing that only a few white persons are engaging in the business, the bulk being done by the Moros, who need no license.

The amount of gutta-percha and rubberwhich has been exported to Borneo and Singapore during this time from all southern Philippine ports amounts to 297,000 pounds, upon which the forestry bureau has collected charges of 3 cents Mexican per pound. This, of course, relates only to that carried on large vessels which regularly clear at the varions custom-houses. How much was shipped to Borneo in small boats can not be estimated.

Respectfully submitted.

Penoyer L. Sherman,
Inspector Forestry Bureau.

For the results of chemical examination of the samples of gutta-percha collected by Dr. Sherman, see the annual report of the Superintendent of Government Laboratories for the year ending August 31, 1902.

Administrative finances.—Revenues and expenses of Philippine forestry bureau for five years.

[Money is expressed in Mexican currency.]

	1901–2.	Spanish administration in Philippines.			
		1896–97.	1895–96.	1894–95.	1893–94.
Salaries	$111,965.31	$136,110.00	$123,385.00	$123,385.00	$118,135.00
Transportation	17,454.84				
Material, etc	25,849.63	16,380.00	15,380.00	15,380.00	15,380.00
Total expenses	155,269.78	152,490.00	138,765.00	138,765.00	133,515.00
Revenues, forest products	348,073.08	170,000.00	150,000.00	122,000.00	122,000.00
Sales public lands		45,000.00	55,000.00	45,000.00	48,000.00
Expense per cent of revenues, forest products	44.6	89.7	92.5	Deficit.	Deficit.

Comparative table of revenues and expenses.

	Philippines, 1901-2.	British Burma, average five years, 1895-1900.[a]	Java, 1900.[a]	Cape Colony, 1899.[a]	Madras.[a]	Cochin China.[a]
Revenue	$348,073.08	$5,412,486.73	$1,849,200.00	$207,452.00		
Expenses	155,269.78	1,690,377.24	979,800.00	560,576.70		
Surplus	192,803.30	3,722,109.51	869,400.00	Deficit.		
Per cent expense of revenue	44.6	31.2	53.5		77	57
Cost per square mile government forests	$2.07	$18.90				

[a] Indian Forester, May, 1902.

Area public forests:	Square miles.
Philippines	75,176
British Burma	89,417

Production of timber, by groups, in cubic feet for the twelve months ending June 30, 1902.

Groups.	July.	August.	September.	October.	November.	December.
	Cubic feet.	*Cubic feet.*	*Cubic feet.*	*Cubic feet.*	*Cubic feet.*	*Cubic feet.*
Superior group	54,553	76,727	34,237	44,180	46,025	37,264
First group	15,192	12,847	9,464	8,321	15,147	8,008
Second group	48,890	68,928	47,191	52,591	69,245	63,775
Third group	191,812	158,888	148,172	217,328	227,353	181,083
Fourth group	40,177	35,276	24,456	42,234	39,440	28,842
Fifth group	12,288	19,557	14,523	22,903	29,909	6,078
Total	362,912	372,223	278,043	387,557	427,119	325,050

Groups.	January.	February.	March.	April.	May.	June.	Total.
	Cubic ft.	*Cubic ft.*	*Cubic ft.*	*Cubic ft.*	*Cubic ft.*	*Cubic ft.*	*Cubic feet.*
Superior group	61,615	51,868	42,078	71,693	83,050	70,477	673,767
First group	7,258	19,161	8,685	14,399	16,990	12,095	147,567
Second group	56,586	46,021	61,569	61,936	40,444	48,724	665,900
Third group	125,987	79,680	177,458	145,554	80,797	164,193	1,898,305
Fourth group	16,064	8,531	26,912	10,950	12,636	19,495	305,013
Fifth group	14,312	926	8,839	12,656	13,935	20,102	176,028
Total	281,822	206 187	325,541	317,188	247,852	335,086	3,866,580
Gratuitous (granted)							894,405
Private lands							196,987
Grand total							4,957,972

Quantities of forest products taken from the public lands of the Philippines during the fiscal year ending June 30, 1902.

Product.	Quantity.	English equivalent.
Timber (maderas)	4,760,985 cubic feet	3,637,392 cubic feet.
Firewood (leñas)	107,900 cubic meters	3,808,870 cubic feet.
Charcoal (carbon)	7,024 cubic meters	247,947 cubic feet.
Rattan (bejuco)	150 piculs	20,685 pounds.
Dyewoods (sibucao and tintorea)	16,363 piculs	2,256,458 pounds.
Tan bark (cascalote)	2,264 piculs	312,154 pounds.
Gum mastic (almaciga)	7,848 piculs	1,082,235 pounds.
Rubber (goma elastica)	2,050.7 piculs	282,996 pounds.
Gutta-percha (guta-percha)	2,705.3 piculs	373,331 pounds.
Vegetable oils (balao)	35,181 liters	9,181 gallons.
Pitch (breas)	826 piculs	113,905 pounds.
Cinnamon (canela)	150 piculs	20,685 pounds.

Revenue on forest products taken from the public lands of the Philippines in pesos for the fourteen months ending August 30, 1902.

Months.	Revenue.
1901.	
July	$29,308.21
August	32,004.38
September	22,808.18
October	17,769.59
November	37,524.33
December	30,592.94
1902.	
January	28,093.29
February	27,727.31
March	22,482.75
April	34,860.26
May	32,500.76
June	32,401.08
Total for fiscal year	348,073.08
July	40,644.26
August (approximate)	24,085.89
Total for fourteen months	412,803.23

Quantity of timber taken from public lands of the Philippines during the fiscal year July 1, 1901, to June 30, 1902.

DISTRIBUTION.

Provinces.	Total for year.	Provinces.	Total for year.
	Cubic feet.		*Cubic feet.*
Abra	3,113	Marinduque	5,247
Albay	48,855	Masbate	151,773
Antique	16,736	Misamis	32,898
Bataan	382,178	Negros Occidental	207,996
Batangas	3,933	Negros Oriental	30,769
Benguet	----------	Nueva Ecija	95,422
Bohol	4,021	Nueva Vizcaya	----------
Bulacan	260,907	Pampanga	229,986
Cagayan	208,153	Pangasinan	116,916
Camarines (Amos)	146,880	Paragua	10,511
Capiz	65,393	Rizal	35,584
Cavite	3,591	Romblon	41,993
Cebu	35,144	Samar	----------
Cottabato	26,065	Sorsogon	65,424
Davao	20,729	Surigao	23,855
Ilocos Norte	72,923	Tarlac	260,035
Ilocos Sur	53,994	Tayabas	435,379
Iloilo	105,717	Union	67,675
Isabela	12,123	Zambales	286,352
Jolo	1,671	Zamboanga	82,873
Laguna	18,585		
Leyte	195,179	Total	3,866,580

Month.	Cut with license.	Cut without license.	Total.
1901.	*Cubic feet,*	*Cubic feet.*	*Cubic feet.*
July	284,830	78,082	362,912
August	269,595	102,628	372,223
September	232,853	45,190	278,043
October	334,428	53,129	387,557
November	364,404	62,715	427,119
December	256,963	68,087	325,050
1902.			
January	249,032	32,790	281,822
February	177,672	28,515	206,187
March	274,763	50,778	325,541
April	264,258	52,930	317,188
May	----------	----------	247,852
June	----------	----------	335,086
Total for year	----------	----------	3,866,580

Groups and varieties, arranged in order of quantities, cut during the fiscal year ending June 30, 1902, from public lands only.

Group.	Number of varieties.	Cubic feet.	Value (Mexican).
III. Third	571	1,855,617	$55,668.51
II. Second	48	708,588	56,687.04
S. Superior	12	673,767	94,327.38
IV. Fourth	85	305,013	6,100.26
V. Fifth	12	176,028	1,760.28
I. First	18	147,567	14,756.70
Total	746	3,866,580	229,300.17

Average value per cubic foot, 6 cents (Mexican).

Group.	Varieties.	Cubic feet.	Group.	Varieties.	Cubic feet.
III	Lauan	656,054	IV	Anam	29,587
III	Apitong	309,823	I	Batitinan	27,649
S	Molave	228,863	II	Palo-maria	26,698
II	Guijo	209,298	III	Cupang	25,379
S	Narra	124,513	III	Pagatpat	24,098
S	Yacal	105,937	III	Malacmalac	24,083
			IV	Malapapaya	23,545
	6 varieties	1,634,488	II	Aranga	23,032
			II	Amuguis	22,832
S	Dungon	76,154	III	Bulao	22,082
V	Bonga	76,038	III	Apuit	21,919
V	Bacao	62,183	III	Mayapis	21,216
III	Sacat	61,451	II	Banaba	19,634
S	Ipil	55,279	III	Calumpit	18,992
			II	Mangasinoro	18,071
	5 varieties	331,605	I	Bansalaguin	18,052
			III	Batete	17,830
IV	Balacat	45,919	III	Panao	16,497
IV	Malasantol	45,214	III	Pagsainguin	16,026
II	Catmon	42,688	II	Banuyo	15,046
S	Calantas	41,614	III	Bayoc	14,469
III	Malaanonang	41,197	V	Anahao	13,122
II	Mangachapuy	36,568	II	Dungon-late	15,532
III	Palosapis	37,879	III	Manicnic	12,301
IV	Malabonga	37,720			
S	Tindalo	37,200		24 varieties	484,692
I	Betis	36,441		16 varieties	608,978
II	Nato	36,417		5 varieties	331,605
III	Balinhasay	36,213			
I	Acle	35,632		45 varieties	1,425,275
II	Macaasin	33,874		6 varieties	1,634,488
IV	Malabalac	31,742			
III	Dalinsi	30,660		51 varieties	3,059,763
				696 varieties	806,817
	16 varieties	608,978		747 varieties	3,866,580

The third group supplied 48 per cent of the total.
Six varieties contributed 42.3 per cent and 51 varieties 79.1 per cent of the total.
Lauan, of the third group, furnished 17 per cent.

Native woods brought to market in the Philippine Islands from July 1, 1901, to June 30, 1902.

SUPERIOR GROUP.	*Amount cut. (Cu. ft.)*	FIRST GROUP.	*Amount cut. (Cu. ft.)*	FIRST GROUP—ctd.	*Amount cut. (Cu. ft.)*
Calantas	41,614	Acle	35,632	Laneta	----------
Camagon	----------	Alahan	----------	Malatapay	----------
Dungon	76,154	Alintatao	----------	Tamuayon	----------
Ebano	----------	Anubing	----------		
Ipil	55,279	Bansalaguin	18,052	Total first	147,567
Mancono	----------	Baticulin(g)	----------		
Molave	228,863	Batitinan	27,649	SECOND GROUP.	
Narra	124,513	Bayuco	----------		
Teca	----------	Betis	36,441	Agoho	----------
Tindalo	37,200	Calamansanay	----------	Alalanget	----------
Yacal	105,937	Camayuan	----------	Alpay	----------
Urung	----------	Camphor	----------	Alupac-amo	----------
		Camuning	----------	**Amuguis 1st**	22,832
Total superior	673,767	Cubi	----------	**Aranga**	23,030
		Jara	----------	**Banaba**	19,632

Native woods brought to market in the Philippine Islands from July 1, 1901, to June 30, 1902—Continued.

SECOND GROUP—ctd.	*Amount cut. (Cu. ft.)*
Banitan	
Batino	
Bayaco	
Banuyo	15,046
Bilolo	
Bolong-eta	
Calimantao	
Calingag	
Caña fistula	
Catmon	42,688
Dolitan	
Dungon-late	12,532
Guijo	209,298
Guisihan	
Lanutan	
Macaasin	33,874
Madre cacao	
Malacadios	
Malacapon	
Malacatmon	
Malaruhat	
Mangachapuy	38,568
Mangasinoro	18,071
Mangasirique	
Marang	
Mulauinaso	
Nangcal	
Nato	36,417
Oayan	
Paitan	
Palayen	
Palo Maria	26,698
Pasac	
Pusopuso	
Romero	
Sirique	
Supa	
Tanguile	
Tansuyod	
Toob or Tua	
Tucan-calao	
Total second	708,588
THIRD GROUP.	
Abagon	
Abalorio	
Abar	
Abilo	
Abobo	
Aclen(g)parang	
Adaan	
Adumuy	
Afu	
Ahmon	
Alacac	
Alacon	
Alagao	
Alalangat	
Alamon	
Alasa	
Alem	
Alibamibang	
Aligamin	
Alioan	
Almolan	
Alpay	
Aludia	
Alupacamo	
Amatog	
Ambiong	
Amian	
Ammapla	
Amoan	
Anagap Casay	
Anago	
Anahanon (Apitong)	309,823
Analig	
Anam	
Anarep	
Anatan	
Adulamon (Andulanan)	
Anigado	
Aninapla	
Aningat	
Anis	
Anitap	
Anobiang (Bayoc) (Annobrang)	
Anobling	
Anonang	
Antcug	
Anteng	
Antipolo	
Apalang	
Apostula	
Apuit	21,919
Arandon	
Arangien	
Aritontong	
Ayo	
Baacan	
Babayan	
Bacayo	
Baclang	
Bacoog	
Baga	
Bagalitotas	
Bagarilao	
Bagobinlod	
Bagocu	
Bagotambis	
Bagotoob	
Baguilio	
Baguilumboy	
Bahay	
Balacbacan	
Balacbalac	
Balaitlog	
Balanga	
Balao	
Baligan	
Balinesoc	
Balingagta	
Balinhasay	36,213
Balintarhan	
Balit	
Balitagtag	
Balopo	
Baloy	
Balungcanit	
Balutay	
Banacao	
Banaypanay	
Bancal	
Bancahoylan	
Bancalan	
Bancalari	
Bancanilan	
Bancolanog	
Banga	
Bangles	
Banguid	
Banilic	
Banitan	
Banite	
Bansilang	
Barangao	
Baransiagao	
Baratayan	
Bariuan	
Barosingsin	
Barosmising	
Baroy	
Barung	
Basa	
Basangal	
Basilayan	
Basug	
Batete	17,830
Batobalarao	
Batobato	
Batocanag	
Bating	
Batunganag	
Bayit	
Bayoc (Anobiang)	14,409
Bayoguiboc	
Bayucan	
Bia	
Bilolo	
Biluan	
Binalia (Binalinan)	
Binalucan	
Binalungay	
Bingas (Binglas)	
Binong (Bitnong)	
Binuang	
Binulo	
Bolilising	
Boloan	
Bolobolo	
Bolongcadios	
Bonoang	
Borros	
Bulala	
Bulao	22,082
Bulo	
Bulog	
Bungal	
Busaeng	
Busili	
Butigan	
Buyo	
Cabagtin	
Cabal	
Cacaate	
Cadiz	
Cahabating	
Calambalin	
Calantil	
Calaolot	
Calapini	
Calasay	
Calibayoan	
Calinan	
Calinas	
Callag	
Calliot	
Calocatmon	
Calomagon	
Calubcub	
Calumgatingan	
Calumpit	18,992
Calungalingan	
Camanchiles	
Camanginan	
Camantayo	
Camantivis	
Camarag	
Candol	
Caniguet net	
Cansolod	
Cansuyot	
Cantingen	
Canulgtingan	
Capasanglay	
Caputihan	
Cararen	
Caratacal	
Caratacat	
Carimbucal	
Carisguis	
Carontingan	
Caropcoc	
Casabang	
Casay, Anagap	
Casiray	
Cayetana	
Cuasicuasi	
Cubatigan	
Culatingen	
Culibabac	
Culicat	

Native woods brought to market in the Philippine Islands from July 1, 1901, to June 30, 1902—Continued.

THIRD GROUP—ctd.	*Amount cut. (Cu. ft.)*	THIRD GROUP—ctd.	*Amount cut. (Cu. ft.)*	THIRD GROUP—ctd.	*Amount cut. (Cu. ft.)*
Cumalisquis		Lettacu		Manga	
Cunacon		Libato		Manganit	
Cunalong		Libato puti		Mangbalut	
Cupang	25,379	Ligamen		Manicnic	12,301
Cutipie		Limbayao		Manili	
Cuyaguia		Linal		Manungal	
Cuyaogao		Linal		Mapilig	
Daeng		Lingolingo		Marabical	
Daguil		Linog		Maracapas	
Daha		Liosin		Maracasile	
Dalinsi	30,660	Liptog		Maragared	
Dalindigan		Litis		Marambolo	
Dalipaen		Lomboy		Masampinit	
Dalunit		Lucban Gubat		Mataaoian	
Dampul		Lugnac		Matabao	
Danaan		Lumacao		Matamata	
Dancalan		Lumagabos		Matangolan	
Dangula		Lumbayao		Matata	
Danlig		Mabolo		Mauro	
Danyay		Macugalum		Mayapis	21,216
Dao		Magabinyo		Miao	
Daracan		Magalayo		Mitla	
Dasadasa		Magarambulo		Morning	
Datino		Magarapale		Mulato	
Diladila		Magarilao		Nalagbo	
Dina		Magarilas		Nasuig	
Dinglas		Magatalay		Niguet	
Dinuguan		Magacalanag		Niguit	
Diraan		Maglibuyo		Nipot-nipot	
Ditaa		Magobinlod		Oas	
Duclap		Magobuyo (Magobaye)		Oayan	
Duguan		Magsampinit		Odling	
Duldolbuquid		Magsangal		Ogao	
Dulilulbugin		Magsinolo		Ontol	
Duran		Magtalisay		Oponopong	
Duyong		Maguinbuyo		Osiben	
Galagala		Mahaguis (Mahalay)		Oyaoy	
Galis		Malaanonang	41,197	Paduco	
Gasatan		Malabacanan		Panglumbuyen	
Gatasgatas		Malabagao		Pagaliyagnin	
Ginlagasi		Malabaguis		Pagatpat	24,098
Guisoc		Malabato		Pagsainguin	16,026
Gueddeng		Malabayabas		Paguan	
Guilac		Malabayabat		Paho	
Guinay-guinay		Malabocboc		Pahopahoan	
Guinlayasi		Malabuga		Pahotan	
Guitot		Malacayang		Pahubo	
Guyongguyong		Malacmac		Paihod	
Hagachac		Malacmalac	24,083	Paina	
Hagadhad		Maladaguin		Palacpac	
Hanagdong		Maladogan		Palataguin	
Hilagasi		Maladoron		Palati	
Himbabaod		Malagagaoao		Palmabrava	
Hindan		Malaganet		Palochina	
Hinlalon		Malaginsihan		Palogapit	
Indang		Malaguisoc		Palosapis	37,879
Janagdong		Malamanga		Pamaltaguen	
Jindan		Malaigot		Pamalitien	
Junop		Malansa		Pamangarem	
Labang		Malapingan		Pamanganomen	
Lacolaco		Malaranum		Pamangarem	
Lagasa		Malasaguin		Pamananglayamen	
Lagnig		Malasaguin puti		Pamayabasen	
Lagting		Malasapsap		Pamiclaten	
Laguimisin		Malasican		Pamitaoguen	
Lalasig		Malasmoro		Pamorideguen	
Lambulauan		Malatabaco		Pamulaten	
Lamian		Malatalang		Pamusilaguen	
Lamim		Malatalay		Panalayapen	
Lanasahan		Malatindalo		Panantuman	
Lanbang		Malatubig		Pananutlen	
Langosi		Malatumbaga		Panao, Balao	16,497
Lanipga		Malaya		Pangalinaoen	
Lapolapo		Malayambo		Pangalingen	
Lasatan		Malit		Pangandongen	
Lasila		Malungay		Pangaolasen	
Lasilasan		Mamalis		Pangatisen	
Lauan	656,054	Mambog		Pangi	
Lauan-pula		Manapias		Panolsalan	
Laylayan		Manayao		Panulatin	
Leggay		Mandalaonon		Panulosiguin	
Lemnan				Panunsungan	

Native woods brought to market in the Philippine Islands from July 1, 1901, to June 30, 1902—Continued.

THIRD GROUP—ctd.	*Amount cut.* (*Cu. ft.*)
Paoan	
Paonilitien	
Papuyay	
Parna	
Paronatin	
Pasan	
Payen	
Piagao	
Pichola	
Pili	
Pipi	
Pisec	
Pisig	
Poguipoc	
Pongui	
Popoyot	
Puigao (Piagao)	
Pulangbalat	
Punhan	
Pusopuso	
Putian	
Quinay-quinay	
Quita-quita	
Sacat	61,451
Sagues	
Saguisi	
Sagummisumis	
Salasala	
Saleng	
Saliesic	
Salomague	
Salongan	
Salong-salong	
Salsaloyot	
Saluyen	
Samac	
Saman	
Sambulanan	
Sambulumin	
Sambutuhan	
Samogui	
Sampuit	
Sanait	
Sandalo	
Santol	
Saray	
Sarmayen	
Sasalit	
Saynbong	
Seggay	
Sigcuran	
Sipingan	
Soroya	
Suitang	
Sulipa	
Tabalangin	
Tabiguc	
Tabgas	
Tabong	
Tabontabon	
Taclanganac	
Tacuban	
Tacuitaqui	
Tagabong	
Tagatoy	
Taggay	
Tagoalom	
Tagobinlod	
Tagogong	
Tagopinay	
Taguitagui	
Tagumtagum	
Taguraguir	
Talacnongen	
Talagtag	
Talagutingan	
Talahangin	
Talay	
Talingaan	
Talisay	
Taloconuguen	

THIRD GROUP—ctd.	*Amount cut.* (*Cu. ft.*)
Taloot	
Talulong	
Talumurung	
Tambalalud	
Tamib	
Tamlang	
Tamlao	
Tamogui (Tamug)	
Tanagosep	
Tangalai	
Tangisan	
Tanto	
Tapuhangin	
Tapuhay	
Tapulao	
Tapulas	
Tarabdab	
Taracatac	
Taran	
Taranglay	
Taras	
Taratara	
Tiaong	
Tiga	
Tigpod	
Tiguem	
Tinaanpantay	
Tingantingan	
Tipolo	
Tiranlay	
Tiwi	
Truel	
Tuale	
Tuel	
Tugaue	
Tumbongaso	
Tungog	
Ubien	
Ughayan	
Ulalud	
Ump (Unip)	
Untol	
Violon	
Yambang	
Yango	
Yayapag	
Yuel	
Total third	1,855,617
FOURTH GROUP.	
Agosos	
Alasas	
Amugan (an)	
Anam	29,587
Anilao	
Atá-ata	
Bagonito	
Bago-santol	
Bait	
Balacat	45,919
Balay-bayan	
Balibago	
Baloc	
Baloc-baloc	
Balubat	
Banato	
Bancalauan	
Barincongcorong	
Batican	
Bating	
Biga	
Bignay	
Bilucao	
Binayuyo	
Binting-dalaga	
Binunga	
Bocboc	
Bogo	
Botong	

FOURTH GROUP—ctd	*Amount cut.* (*Cu. ft.*)
Calay	
Caloc-catmo	
Calumpang	
Caraol	
Culis	
Danloy	
Danlay	
Duca	
Guyonguyon (Salingogan)	
Himbabao	
Hopong-Hopong	
Lagasa	
Libas	
Ligao	
Lunas	
Macaturay	
Maguilic	
Malaaduas	
Malabago	
Malabonga	37,720
Malabulac	31,742
Mala cacao	
Malacamote	
Malac(au)ayan	
Malaga-itiman	
Malaiba	
Malaicmo	
Malanbang	
Malapalitpit	
Malapapaya	23,545
Malasamat	
Malasantol	45,214
Malatagon	
Malatubig	
Matobato	
Oonog	
Paihot	
Payaquitan	
Pingol	
Pototan	
Puray	
Putad	
Rubian	
Sagum-sagum	
Salamungay	
Salingogan (Guyonguyon)	
Surug	
Tabao	
Taboc	
Tanag	
Tanglon	
Tical	
Tinaan	
Tinaan-pantay	
Tive-tive	
Uban	
Total fourth	305,013
FIFTH GROUP.	
Bacao	62,183
Bacauan	
Biuas	
Culasi	
Libato-pula	
Libatong-puti	
Tangal	
PALMS.	
Anahao	13,122
Anibong	
Barangoy	
Bonga	76,038
Luyos	
Total fifth	176,028

	Number varieties brought to market.
Superior group	12
First group	18
Second group	48
Third group	572
Fourth group	85
Fifth group	12
Total	747

All unknown woods when brought to market are classified and appraised as third-group woods.

Wood exports from the Philippines for the four fiscal years 1899–1902.

[Values are in gold.]

Country.	1899.	1900.	1901.	1902.	Total.
Hongkong	$1,062	$23,836	$5,318	$30,956	$61,172
French China				38,095	38,095
United Kingdom	4,400				4,400
All others				[a]3,343	3,343
Total	5,462	23,836	5,318	72,394	107,010

[a] United States $983.

Wood imports into the Philippines for the fiscal year ending June 30, 1902.

Country.	Dutiable.		Free.	Total.
	Gold value.	Cubic feet.	Cubic feet.	Cubic feet.
United States	$183,308	666,214	367,537	1,033,751
All others	125,374	727,674		727,674
Total	308,682	1,393,888	367,537	1,761,425

Exports of Philippine forest products, by custom districts, for the fiscal year ending June 30, 1902.

Articles.	Manila.	Iloilo.	Cebu.	Zamboanga.	Jolo.	Total.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
Gum mastic (almaciga)	880					880
Copal	568,706			29,704	396,670	995,080
Pitch (brea)	56,079			495	704	57,278
All other gums and resins	733,394		4,564	281,239	[a]1,872	1,021,069
Glue	45,753	8,251	97,330			151,334
Cabinet ware and furniture	1,163					1,163
All other manufactured wood	32,133					32,133
All other unmanufactured wood	91,605		5,333,200			5,424,805
Sapan wood		7,383,483				7,383,483

[a] Includes 1,344 pounds from the port of Siassi.

Imports of forest products, by leading countries, for the fiscal year ending June 30, 1902.

Articles.	United States.	British East India.	Germany.	United Kingdom.	All others.	Total.	Value in gold.
Timber:	*Cu. feet.*	*Cu. feet.*	*Cu. feet.*	*Cu. feet.*	*Cu. feet.*	*Cu. feet.*	
Sawed	60,116	29,112	2,088	36	3,871	95,223	$23,938
Hewn	59,724	26,928	1,584	1,080	6,660	95,976	32,110
Logs	41,724	144	0	52	1,194	43,114	7,814
Boards, deals, and planks	504,473	68,976	12,384	6,408	111,769	704,010	237,914
Pine wood, unplaned					372,000	372,000	5,449
All other wood	177	1,295	68,808		13,285	83,565	1,557
Total quantity wood	666,214	126,455	84,864	7,576	508,779	1,393,888	308,582
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	
Naval supplies: Resin, tar, turpentine, and pitch	411,138	152	16,457	907,378	141,459	1,476,584	$23,024
Total value forest products (gold)	$187,910	$36,850	$21,415	$17,962	$67,469		$331,606

World statistics of rubber and gutta-percha.

WORLD'S ANNUAL PRODUCTION OF RUBBER.[a]

	Long tons.
Brazil, Peru, etc. (Para)[b]	22,500
Brazil, Ceara, etc	4,700
Brazil (Mangabeira)	3,250
Bolivia	1,500
Rest of South America	2,300
Total South America	34,250
Central America and Mexico	2,500
Total America	36,750
East and West Africa[c]	24,500
India and Burmah	400
Ceylon	7.5
Java, Borneo, etc	1,000
Total	62,657.5

WORLD'S ANNUAL CONSUMPTION OF RUBBER.[a]

	Long tons.
America (United States and Canada)	20,000
United Kingdom, etc., except Canada	22,500
Continent of Europe[d]	20,000
Total	62,500

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[a] Adapted from "India Rubber, gutta-percha, and balata," by Wm. T. Braunt, 1900, p. 89.

[b] Para exports in 1901 aggregated 29,800 long tons. India Rubber World, February, 1902.

[c] Includes 500 tons for Madagascar and Maritius.

[d] Germany the leading country; third in the world, following the United States and Great Britain.

The principal import markets for india rubber are, in approximate order, New York, Liverpool, Hamburg, Antwerp, Havre, London, Lisbon, Rotterdam, and Bordeaux.

Rubber imports, exports, and manufactures of the United States.

IMPORTS.

Sources.	Short tons.	Value (gold).
Brazil	17,398	$16,919,707
United Kingdom (reexports)	3,732	4,241,959
Belgium (reexports)	2,576	3,311,776
Portugal (reexports)	1,049	1,159,234
Germany (reexports)	837	794,534
Central America	634	673,126
Ecuador	366	335,764
Rest of Europe (France and Holland)	301	335,639
British East Indies	281	247,993
Rest of South America	265	255,064
Rest of North America	199	180,539
Total, fiscal year 1901	27,638	28,455,383
Total, fiscal year 1900	24,700	31,376,867
Total, fiscal year 1891	16,860	17,856,280
Average, 10 fiscal years, 1891-1900	19,880	21,134,600

EXPORTS.[a]

Total, fiscal year 1901	1,653	$2,302,109
Total, fiscal year 1900	1,876	2,760,046
Average, 5 fiscal years, 1895-1899	1,326	1,433,000

[a] Chiefly to Canada.

MANUFACTURES.

Consumption of crude india rubber (net imports), tons	25,985
Value (gold)	$26,153,274
Average value per ton	$1,006
Manufactures, seven States, Twelfth Census [1]	$87,172,694
Manufactures, all States, estimated total	$100,000,000
Approximate value per ton	$4,000
Manufactures, Eleventh Census [1]	$42,853,757
Exports of manufactures, 1901 [2]	$3,246,663
Imports of manufactures, 1901	$478,663
Net exports of manufactures	$2,767,970
Net consumption (estimated)	$97,232,030

The total value of rubber goods imported into the Philippines in 1901 (fiscal year) was $71,829, of which $21,480 worth was from the United States, $21,472 from Great Britain, and $13,971 from Germany. The previous maximum imports from the United States was $4,936, for the fiscal year 1900.

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[1] Including relatively small amount of gutta-percha manufactures. The estimated total is from India Rubber World, July, 1902, p. 311.

[2] The value of boots and shoes makes up one-fourth of the exports, which average only one-fourth of the German exports and only one-half of the British exports of rubber goods.

Imports and exports of gutta-percha, gutta-inferior, and india rubber at Singapore, Straits Settlements, during the calendar year 1901.

Imports.	Gutta-percha.			Gutta-inferior.			India rubber.		
	Piculs.	Value (Mex.)	Average per picul.	Piculs.	Value(Mex.)	Average per picul.	Piculs.	Value(Mex.)	Average per picul.
Sumatra	28,778	$4,418,385	$153.53	868.5	$7,090	$8.02	210	$26,000	$123.80
Dutch Borneo	[a] 17,061.5	3,502,210	205.27	117,786	866,796	7,36	63.5	6,771	106.60
British Borneo [b]	6,281	1,137,640	181.12	26,603	200,557	7.54	473.8	53,924	113.70
Sulu Archipelago [c]	1,966.5	150,299	76.43						
Java	624.5	72,775	116.63	95	1,852	19.40	20	3,460	173.00
Philippines [c]	105	8,550	81.43						
Total, including all others	59,331	9,889,583	166.67	149,396.5	1,109,015	7.42	773.8	90,642	117.14
Dutch possessions [d]	46,866.5	7,957,975	169.82	119,119.5	878,938	7.39	294.5	36,391	123.50
British possessions	7,175	1,248,025	173.94	26,603	200,557	7.54	473.8	53,924	113.80
American possessions	2,071.5	158,849	76.69						
	Short tons.	*Gold value.*		*Short tons.*	*Gold value.*		*Short tons.*	*Gold value.*	
Calendar year 1901	3,955	$4,826,117	[e] $1,220.25	9,959.8	$541,199	[e] $54.00	51.6	$44,233	[e] 857.00
Calendar year 1900	4,938			7,842					

[a] Including 634 piculs, worth $90,370, from Chinese ports received at Penang, and excluding 4,317 piculs, worth $470,452, from Sumatra received at Penang.

[b] Including imports from Sarawac, British North Borneo, and Labuan Island.

[c] The average import value of the 2071.5 piculs received at Singapore *directly* from the Philippines and the Sulu Archipelago was only $76.68 (Mex.) per picul compared with $169.91 (Mex.) for all the rest. Large quantities of gutta-percha not credited above to the Philippines or the Sulu Archipelago arrive indirectly at Singapore via Borneo.

[d] Including Netherlands Archipelago.

[e] Average per ton.

Imports and exports of gutta-percha, gutta-inferior, and india rubber at Singapore, Straits Settlements, etc.—Continued.

Exports. a	Gutta-percha.			Gutta-inferior.			India rubber.		
	Piculs.	Value (Mex.)	Average per picul.	Piculs.	Value(Mex.)	Average per picul.	Piculs.	Value(Mex.)	Average per picul.
United Kingdom	55,777	$12,233,356	$219.30	9,487	$173,533	$18,30	939	$102,653	$109.32
France	7,793.7	1,374,199	176.30	9,651	108,488	11.24			
Germany	5,383	330,042	61.31	11,176	182,511	16.33	40.8	8,075	197.91
United States	2,797.5	226,605	81.00	121,303.8	929,570	7.66	11	1,500	136.36
Belgium	247.5	23,155	93.55	1,122	10,762	9.50			
Italy	180.9	20,080	111.00	125	875	7.00			
Japan	6	330	55.00	3	70	23.33	172.5	25,295	146.63
Netherlands	5	1,000	200.00						
Total, including all others	73,815.9	14,427,589	195,00	153,001.8	1,406,919	9.20	1,188,8	139,745	117.55
	Short tons.	*Gold value.*		*Short tons.*	*Gold value.*		*Short tons.*	*Gold value.*	
Calendar year 1901	4,921	$6,272,865	b $1,274.00	10,200	$611,704	b $59.97	79.3	$60,772	b $766.36
Calendar year 1900	6,493			6,395					
Average 12 years, 1885-96 c	2,890	1,966,596	b 680.48						

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a "Singapore is the principal and almost exclusive market for the export of crude gutta-percha. The leading European markets are Liverpool, London, Marseilles, Rotterdam, and Hamburg."—Brannt.

b Average per ton.

c Adapted from "India Rubber, Gutta-Percha and Balata," W. T. Brannt, 1900, which also gives the following annual distribution of gutta-percha exports reduced to short tons and averaged for the same period of 12 years, 1885-96: United Kingdom, 2,197 (nearly one-fourth reexported, chiefly to Germany, France, and Holland); France, 253; Germany, 220; United States, 177; Holland, 20; all others 24; total, 2,890.

Prices of india rubber.

[New York quotations, June 28, 1902.[a]]

Varieties.	Per pound.	Varieties.	Per pound.
PARA.		AFRICAN.	
	Cents.		*Cents.*
Islands, fine, new	68 to 69	Tongues	42 to 43
Islands, fine, old	71 to 72	Sierra Leone, first quality	60 to 61
Upriver, fine, new	70 to 71	Benguella	42 to 43
Upriver, fine, old	74 to 75	Cameroon, ball	42 to 43
Islands, coarse, new	44 to 45	Flake and lumps	29 to 30
Upriver, coarse new	55 to 56	Accra, flake	17 to 18
Caucho (Peruvian), sheet	47 to 48	Accra, buttons	43 to 44
Caucho (Peruvian), ball	51 to 52	Accra, strips	47 to 48
		Lagos, buttons	43 to 44
CENTRALS.		Lagos, strips	47 to 48
Esmeralda, sausage	50 to 51	EAST INDIAN.	
Guayaquil, strip	47 to 48	Assam	52 to 53
Nicaragua, scrap	49 to 50	Borneo	30 to 40
Mangabeira, sheet	39 to 40		

[a] India Rubber World, July, 1902.

Fluctuations of New York prices per pound for islands spot fine Para rubber for three years (gold).[a]

Month.	1899.	1900.	1901.
Average:			
January	$0.94	$1.06	$0.85
February	1.00	1.04	.84
March	1.04	1.02	.835
April	1.02	.99	.89
May	1.01	.94	.87
June	.94	.92	.85
July	.96	.89	.835
August	.97	.95	.84
September	.98	.97	.86
October	.98	.97	.81
November	1.03	.93	.78
December	1.05	.86	.80
Year (average)[b]	.99	.96	.84
Average American import values for all kinds of rubber[b]	.621	.635	.533

[a] India Rubber World, February, 1902.
[b] Idem, September, 1901.

The following arrivals (including Caucho) at Para, in long tons, for the crop years indicated, ending June 30, will give a clue to the fall in market price of Para rubber, as shown above:

1896-97	22,320
1897-98	22,250
1898-99	25,370
1899-1900	26,670
1900-1901	26,610
1901-1902[1]	30,000

Gutta-percha.

[Gold prices per pound.]

Market.	Date.	First quality.	Medium.	Lower.
Singapore	August, 1900[a]	$1.57 to $1.82	$0.91 to $1.57	$0.19 to $0.91
Do	August, 1901[b]	1.55 to 1.96	.98 to 1.46	.16 to .65
New York	May, 1901[c]	1.75	1.45	.65

[a] India Rubber World, October, 1900.
[b] Agricultural Bulletin of the Straits and Federated Malay States, October, 1901.
[c] India Rubber World, June, 1901.

Respectfully submitted.

George P. Ahern,
Captain, Ninth Infantry, Chief of the Forestry Bureau.

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[1] India Rubber World, July, 1902.

APPENDIX K.

REPORT OF THE CHIEF OF THE MINING BUREAU FOR THE PERIOD FROM JULY 1, 1901, TO AUGUST 31, 1902.

OFFICE OF THE MINING BUREAU,
Manila, P. I., August 23, 1902.

Hon. DEAN C. WORCESTER,
Secretary of the Interior, Manila, P. I.

SIR: Before taking my departure for a two months' leave of absence, after more than four years of continuous service in these islands, I have the honor, in anticipation of a call for an annual report from this bureau, to submit to you the following report of this bureau from June 30, 1901, and brought down to the date of this report, and covering the fiscal year ending June 30, 1902:

GENERAL AND SPECIAL REPORTS OF THIS BUREAU.

Although somewhat less in number than the previous year, the amount of work and labor covered by the reports of this year is far in excess of that reported for the previous year. These reports are:

June 25, 1901: Report to Hon. William H. Taft, president United States Philippine Commission, on the "Reorganization of the mining bureau, with draft of proposed act."

July 3, 1901: Report to the Philippine civil-service board on "Efficiency of bureau employees."

July 6, 1901: Report to First Lieut. W. B. Burtt, Fifth Infantry, U. S. Army (by order of military governor), on "Field notes of mines in Lepanto."

July 8, 1901: Special report to civil governor on "Quarters for the mining bureau."

September 2, 1901: Report to civil governor on the "Opening of an office and the collection of fees for recording mining claims by treasurer of Surigao."

September 9, 1901: Report to Philippine civil-service board on "Standing of employees."

September 30, 1901: Annual report, 1900–1901, to civil governor. (Appendix K, Vol. II, Report of United States Philippine Commission, 1901.)

October 11, 1901: Report to the secretary of the interior submitting proposed mining code and brief thereon.

October 17, 1901: Report to the secretary of the interior and "Abstract of record of expedientes for coal claims near Cabancalan."

October 23, 1901: Special report on Sanger, Vera & Co.'s claims and record.

October 24, 1901: Report on "Application for recognition of copper-mining concessions at Mancayan, Luzon, province of Lepanto (Cantabra-Filipina)."

November 4, 1901: Report to the secretary of the interior on proposed mining law.

December 10, 1901: Report on the "Gil Brothers' coal mining claims on the island of Batan."

January 10, 1902: Report (by H. D. McCaskey, M. E. of the mining bureau) to Lieut. Edward Markham, Corps Engineers, U. S. A., "Assays of certain coals, Batan, Japan, etc."

January 31, 1902: Report to the secretary of the interior on "The mining claims of Antonio Fuset."

February 4, 1902: Report to the secretary of the interior on "The Spitz coal mines and claims in Cebu."

February 17, 1902: Report to the civil governor on "Estimates for fiscal year ending June 30, 1902."

February, 1902: Bulletin No. 1 of the mining bureau on "Platinum and associated rare metals in placer formations," by H. D. McCaskey, B. S., mining engineer of the mining bureau.

March 20, 1902: Report to Hon. W. L. Goldsborough, city attorney of Manila, on "The quarries of Binangonan."

June 7, 1902: Report to Hon. W. Morgan Shuster, collector of customs for the Philippine Archipelago on "Importation of skilled labor for mining."

August 7, 1902: Report to the civil governor on "The iron mines of Angat, in Bulacan—the Constancia, Santa Lutgarda, and Hison mines." (This report relates to titles and history only.)

CORRESPONDENCE.

During the current year the volume of correspondence in this bureau has greatly increased, the records of the office showing the receipt of 725 letters considered of sufficient importance for their preservation and entry in the archives of the bureau and 769 letters sent having a like registry.

THE MOVING OF THE MINING BUREAU.

The work of the bureau has been greatly impeded and hindered during the present year by the necessity of seeking a new location for the bureau and the removal of its offices, laboratory, and museum from its quarters in the Cuartel de Ingenieros to its present quarters in the Casa de Moneda. This makes the second move in two years. This last move was occasioned by the demand of the military government for the vacation of the Cuartel de Ingenieros that it might be used by the army and navy club, a social organization composed principally of officers of the army and navy. This change was made in January, 1902, and three months of valuable time was lost in our laboratory work by the necessary delays in packing and unpacking and in fitting the new quarters for the purposes of the bureau.

The present quarters are in the old mint building, which, aside from its being in a bad state of repair and in poor sanitary condition, will no doubt soon be required for the purpose for which it was formerly occupied—that of a government mint—thus making it necessary to move this bureau again.

This bureau has also experienced much delay and difficulty in its work by reason of its separation from the various coordinate bureaus with which it must necessarily do business, and especially by the inability to secure transportation to and from the other bureaus on official business. This bureau can not too strongly urge that a building may be speedily erected wherein the bureaus of public lands, mining, forestry, and government laboratories, at least, may be under the same roof, since each of these bureaus have to do with the public lands and their forestry and mineral products, and require constant reference to and conference with each other. The present quarters of this bureau are insufficient and unsatisfactory, and are, at the best, but a makeshift.

WORK ON THE PROPOSED MINING CODE.

Much time has been expended in an attempt to aid in the preparation of a new mining code for these islands, to be recommended to the Congress of the United States. Only those who are entirely familiar with the conditions existing in this archipelago as relates to Spanish titles, the conditions under which they are held, and the practices of the government of the Philippines under Spanish rule in the administration of their mining code, can appreciate the difficulty of establishing a code that would protect every valid and legal right covered by the treaty of Paris and at the same time give sufficient clearness to a new code to enable those who had real possessory rights, though not of record, owing to the right of free exploitation of certain substances, a reasonable opportunity to save and protect those rights under the new code. Congress has provided a code of its own by which it has clearly intended to protect vested rights under treaty.

DIVISION OF THE MINERAL-LAND ADMINISTRATION.

By the terms of the act of Congress the administration and granting of titles to mineral lands now belong to the bureau of public lands, while the mining bureau (although not continued or authorized by Congress in express terms), as the successor of the inspección-general de minas, retains the administration of the mineral lands held under Spanish grants. Thus the administration of the mineral lands, so far as working and maintenance of the title is concerned, is vested in two different and separate bureaus. It is clear that this should not be; that the administration of all mineral lands should be intrusted to the one bureau or the other. It can not be given to the mining bureau, since the act of Congress expressly grants that administration to the bureau of public lands, and thereby the bureau of public lands obtains a direct recognition and authority of establishment and continuance. The inference is therefore conclusive that the mining bureau, which is not continued in force and established by direct legislation in the act of Congress, but is only continued by inference, must and should be absorbed in the bureau of public lands, at least in so far as the administration of the mineral lands is concerned; and whatever can or may be done under section 60 of the act of Congress in reference to Spanish mining grants should be done from the bureau of public lands. Any other disposition must lead to endless conflict and confusion.

The chief of this bureau has anticipated the termination of this bureau in its administration of public mineral lands, and in that result, reached as an inevitable conclusion from a reasonable interpretation of the act of Congress, heartily concurs, believing, as he does, that it is right and proper and in the interest of intelligent and economical government.

The continuance of the mining bureau for other purposes is necessary and essential, and will be made the subject of recommendation hereafter; but here we desire to say that, in the interests of mineral and mining development and economical administration, the immediate or early transfer of the records and archives of the mining bureau, in so far as they relate to Spanish titles and grants and all things connected therewith—and which exhausts the entire archives and records of this bureau, except such as relate solely and exclusively to geological and mineralogical studies and surveys, and the maps bearing upon that branch of work of the late inspección general de minas—is naturally demanded.

CHRONOLOGICAL INDICES.

Foreseeing the necessity of ready reference to the archives and records of this bureau when the question of administration of mineral grants and mineral lands should be reached, I am pleased to inform the government that a complete chronological index of the records, archives, books, and papers of this bureau from the earliest times down to the close of the Spanish administration has been completed and is being rapidly transferred to permanent index books, the work that now remains to be done being only clerical labor. By these index books there is shown in chronological order every document and entry, with a brief abstract showing its nature, the province to which it relates, the class and kind of material, the name of the party in interest, and a reference to the portfolio or book in which the entire document can be found, with references and cross references wherever required. This work will be entirely copied and compared within three months, as the year 1860 has already been reached. Thus far it is written only in the Spanish language, but blank books have been provided for an English translation, and I trust that this work will be completed under the direction of this bureau before the inevitable transfer of the records and archives is made to the bureau of public lands; or, at least, that the work will be continued by the same employees and under the same director as at present until completed. The value and benefit of these indices can scarcely be calculated, and by no means should they be abandoned, whatever may be the disposition made of such archives.

MINERALOGICAL ARD GEOLOGICAL SURVEYS.

The most important work of the mining bureau has been its institution of a system of mineralogical and geological surveys. After a careful consideration and study of the practical needs of this country and a review of the work along these lines attempted in former years, a plan was perfected for a survey of the iron-mining region of Bulacan, within the jurisdictional limits of the pueblo of Angat. The United States Philippine Commission granted the necessary appropriation, and on March 3, 1902, the party left Manila under the direction of H. D. McCaskey, B. S., the mining engineer of this bureau, and proceeded to carry the plan of field operations that had been agreed upon into execution. The expedition was in every sense successful, and from the vast amount of data and material collected the report of the engineer, which will be published as a bulletin of the bureau, has been elaborated. Mr. McCaskey's report speaks for itself, and I take this occasion to recognize the careful, studious, and painstaking labor that has distinguished him in the performance of the laborious service in connection with this survey. The result of this survey embodied in Mr. McCaskey's report, and the fine collection for the museum, has demonstrated, as I believed that it would, the wisdom of conducting this class of work from a bureau located in Manila, where the condition and needs can be better understood than from a distant point in another country. The advantage from a scientific, industrial, and economical point of view is all in favor of the permanent establishment and early organization of a system of mineralogical and geological surveys conducted along substantially the same lines as that which has been followed in the Bulacan iron regions. For the information of the legislative and executive departments of the government I have compiled the following statement of costs and expenses incurred in this work, with other figures touching upon the question of economy in this class of work:

Whole number of days spent, including going and coming	45
Actual number of days in the field	39
Whole number in party	7
On regular pay roll	2
Temporary employees, including guides	5

	Total.	Per diem.
Wages of labor on regular pay roll	$175.00	$3.888
Wages of labor on temporary pay roll	144.42	3.209
Subsistence in the field	104.61	2.324
Freight and transportation	100.66	2.236
Incidental expenses	2.86	.063
Total	527.55	11.720

The cost of subsistence for the party was $0.332 per day for each man. Wilson's Topographical Surveying, at page 833, gives the following per diem cost of subsistence:

"Near large markets and convenient to railways the ration—that is, the food of one man for one day, on the above basis—costs from 45 to 55 cents. It rarely exceeds 75 cents in the most inaccessible localities in the United States."

The above quotation takes no account of transportation of the ration, and therefore the comparative costs are as follows:

Subsistence, 7 men 45 days, in Bulacan survey, at $0.332	$104.61
Subsistence, 7 men 45 days, near great markets and convenient to railways in United States:	
Minimum, at $0.45	141.75
Maximum, at $0.55	173.25
Subsistence, 7 men 45 days, most inaccessible places of United States, at $0.75	236.25
Subsistence, 7 men 45 days, plus transportation of rations, employees, and all field equipments, and plus eight days' subsistence of an inspector and his transportation in Bulacan survey, at $0.651	205.27

The survey in Bulacan was conducted at a long distance from large markets and in mountains that are rough and precipitous, covered with heavy timber and thick tropical undergrowth, with only narrow and rough footpaths, and where all transportation was by native burden bearers, carrying only a few pounds per man, as many as fifty native carriers being required to move the camp and supplies, and yet the entire cost of subsistence, freight transportation, and inspection was $30.98 less than the item of subsistence alone for a like party an equal length of time in the "most inaccessible portions of the United States." These figures speak for themselves, and establish the fact that from an economical standpoint these mineralogical and geological surveys can be best conducted by men who have, by years of experience in this country and an acquaintance with its people, acquired the necessary practical knowledge of the methods calculated to produce the best results with the least expenditure of money.

BULLETIN NO. 1.

In the month of February the manuscript for the first bulletin issued by this bureau was completed, and on the first of the current month the first edition of 1,500 copies was delivered by the public printer, and it is now ready for distribution. It is entitled "Platinum and Associated Rare Metals in Placer Formations," and is the work of H. D. McCaskey, B. S., mining engineer for the mining bureau, and is intended for the use of miners and prospectors. The purpose and object of this little handbook of practical information is well stated by its author in the opening paragraph:

"It is perhaps more than a possibility that among the river gravels and the beaches of the Philippines there will be found platinum and the associated metals, whether occurring with gold or not. In the hope that these rare and valuable metals may be eventually discovered and worked with profit in these islands, and with the belief that information bearing upon the subject will be of interest and value to placer miners, both present and prospective, this bulletin is now published.

"We have prepared these notes for those whose inquiries may be partially or wholly met by what is briefly presented here."

And this purpose is carefully elaborated by plain and easily understood descriptions of mineralogical characteristics, useful tests, suggestions for concentrating, and metallurgy of these rare metals. It is desired to extend this series of bulletins from time to time, and it is believed that the interests of the archipelago will be greatly advanced and its mineral development materially quickened and enhanced by similar bulletins upon other minerals. The cost of these bulletins is very inconsiderable, and the demand for the one already published clearly indicates the appreciation of those who are actually interested in prospecting in these islands.

PUBLICATION OF THE SPANISH MINING CODE.

The Abstract of the Spanish Mining Code, the publication of which was recommended in my last annual report, has been revised and carefully corrected and annotated, and an edition of 1,000 copies is now printed and awaiting orders for its distribution and sale. The value of this book consists principally in its use as an authority in the administration of the Spanish mining grants, and in the litigation that will arise in reference thereto before the supreme court, courts of first instance, and such other and further tribunals for the consideration and determination of the validity of Spanish mining grants in these islands. In view of the provisions of sections 60 and 62 of the act of Congress now in force in these islands, this book can not fail to prove one of great value, containing, as it does, not only the full text of all laws and royal orders, but also a carefully prepared abstract of notes, with references, cross references, and annotations. The book is published only in the English language.

A COURT OF LAND CLAIMS.

The recent controversies over titles to iron mines in the province of Bulacan together with the representation of other claims, the titles to which are involved in more or less obscurity, and the added experience of another year has only served to emphasize the recommendation of this bureau made in its last annual report, that a court should be established, and at once, with jurisdiction ample and sufficient for the trial and determination of the validity of titles of private land claims of all kinds. The authority exercised in such matters by the officers of the King of Spain is not vested in any officials or departments of the present government, and the judges of such a court should be chosen with special reference to their qualifications for the decision of these subjects and they should be relieved entirely from the general jurisdiction over all classes of cases, both civil and criminal, that now attaches to the general courts of record.

COMPLETION OF WORK ON TITLES.

The necessity for the reestablishment of the inspeccion general de minas under American occupation grew out of the demands made upon the military government for the recognition and perfection of Spanish mining grants. This bureau was accordingly created by Maj. Gen. E. S. Otis, under the name of mining bureau, in general orders on March 10, 1900, and was immediately organized by the present chief of the bureau, he being detailed for this work as first lieutenant of the Eleventh Cavalry, U. S. Volunteers. No specifications as to the jurisdiction, powers, or authorities conferred were contained in this general order, aside from its being designated as a reestablishment of the inspeccion general de minas; but its work soon became largely fixed by the nature of the necessities that caused its reestablishment. A large portion of the time of the chief of this bureau has been since consumed in the examination of these titles and in reporting to the civil and military governments thereon. During the period of time since the reestablishment of this bureau every class and species of claim under Spanish grants or Spanish mining laws has been made the subject of report and explanation, including the ancient grants.

These opinions and reports are all contained in bound volumes and systematically arranged for reference. This class of work will no longer be required in this bureau, and the only thing left in connection therewith is the administration of the Spanish grants under the sixtieth section of the act of Congress, the decision as to cancellation and validity of titles being expressly conferred upon the courts. The only questions attempted to be decided in this bureau in connection with these titles have been whether or not upon the existing records a prima facie evidence of title was shown. These decisions are by no means conclusive, since upon hearings before the courts and tribunals established and to be established for the trial of these questions, other and further evidence, and outside of the official records, will be presented. This bureau has felt the need of such an increased jurisdiction and authority for inquiry and has so recommended.

RECOMMENDATIONS.

I have the honor therefore to recommend:

The appointment of a commission to prepare and submit supplemental legislation for the consideration of the honorable United States Philippine Commission for the carrying into execution of all the provisions of the act of Congress relating to mining and the correction, so far as possible, of the inequalities in taxation and annual labor.

The transfer of the records and archives relating to the titles of mineral lands from the mining bureau to the bureau of public lands, together with the administration of Spanish mining grants under section 60 of the act of Congress.

The reorganization of the mining bureau and the introduction of a systematic plan for the geological and mineralogical survey of these islands, with a skilled and learned mineralogist and geologist of experience at the head of such bureau.

The establishment of a special court of private land claims having exclusive jurisdiction in all matters relating to titles upon mineral lands (with other public lands) and questions relating thereto, the decision of which by the act of Congress is required to be made by the courts.

The construction of a suitable building or buildings for the mining bureau in connection with the bureau of public lands and other bureaus whose work requires frequent conference.

The publication of bulletins of general and practical information, and especially the publication of a bulletin containing the complete list of all claims under Spanish law appearing upon the records, and the material for which is already prepared in this bureau.

The enactment of regulations for the use of timber in mining that will make it practically free for that purpose, and especially when used in connection with coal and iron mines.

The study of road-making material and the preparation of bulletins on that subject and also on the minerals used in the arts and industries.

Respectfully,

Charles H. Burrill,
Chief of the Mining Bureau.

Office of the Mining Bureau,
Manila, P. I., August 23, 1902.

The annual report of H. D. McCaskey, B. S., mining engineer for the mining bureau, of this date, made to the chief of the mining bureau, together with its suggestions and recommendations, is approved and will be attached to the annual report of this office to the honorable secretary of the interior.

Charles H. Burrill,
Chief of the Mining Bureau.

ANNUAL REPORT OF H. D. McCASKEY, B. S., MINING ENGINEER.

OFFICE OF THE MINING ENGINEER, MINING BUREAU,
Manila, P. I., August 23, 1902.

Mr. CHAS. H. BURRITT,
Chief of the Mining Bureau, Manila, P. I.

SIR: I have the honor to submit herewith the following brief report of the work done in the departments of the bureau under my charge since my last annual report:

THE MUSEUM.

The geological, mineralogical, and lithological collections of the mining bureau, numbering over 3,000 specimens, have been materially increased during the past year from various sources. Efforts have constantly been made to encourage not only prospectors, but teachers, provincial officers, business men, and officers of the Army to send in to the bureau, by mail or otherwise, specimens of the rocks, minerals, and fossils to be found in the vicinity of their residences; and, as an encouragement, the bureau has offered to return such information regarding the specimens as may be within its power and of interest to the donors. To a certain extent these efforts have proved successful, and, as a result, the collections of the museum are constantly growing and becoming more representative of the rock formations of the islands. Unfortunately but few fossils have been received, and but little interest has been shown in paleontological work. As might have been expected, a large proportion of the specimens have been presumably samples of ore to be assayed for gold. The bureau is desirous of obtaining as much and as accurate information as possible concerning the mineral resources of the archipelago, and it would have been a matter of great satisfaction could assays have been made of all promising samples for the information thereby obtainable alone. For lack of time, and because it has never been the policy of the bureau to do general assay work or to enter into the field of competition with custom assayers, but little of this kind of work has been done.

A very complete series of questions bearing upon the geology of ore-bearing districts has been made out by me, however, and in a few cases where prospectors have been willing and able to answer these questions, when there has been time and material for the purpose, and where samples have appeared upon inspection to be worth the work, some fire assaying has been done. The sole object of this work has been that of obtaining information not otherwise available; no charge whatever has been made for the work, and no return has been received save the information sought for official record.

The museum has therefore increased during the year in number and variety of specimens, and every effort has been made to build up a collection that will be of value to all interested in the mineral resources of the Philippines. It is hoped that circular letters may be prepared and printed at an early date, embodying a certain number of specific questions that will develop valuable information, and certain instructions or suggestions of a simple and practical character that may tend to make the collection of minerals and fossils of interest, and possibly of profit, to the collectors. The bureau will at all times thankfully receive specimens of minerals, rocks, and fossils, and information of any kind bearing upon these subjects, and in return will gladly furnish any information or service within its power and not incompatible with the public good.

The list of donors to the museum is too long to present in this report. All courtesies and favors extended to this department of the bureau are here, however, cordially acknowledged.

THE LABORATORY.

During the past year it became necessary to move the office of the mining bureau from Calle Santa Potenciana to the present location on Calle Cabildo. This involved the careful packing of thousands of mineral specimens, and of a large amount of chemical apparatus and glassware.

The removal of the offices and property was effected without material loss, and the location at present occupied is as satisfactory as a building not constructed for the purpose could be. The change in quarters has enabled the fitting up of a fire room and of a general working laboratory that were impossible in the building formerly occupied. Plans were submitted by me for the erection of two furnaces recently received from the United States, for a hood for noxious fumes, and for a sink with drying trays. The plans were approved by the chief of the bureau and by the honorable secretary of the interior, the United States Philippine Commission appropriated the small amount of money required, and the work was done by contract according to the plans. The fire room now contains a Battersea iron-bound fire-clay furnace, adapted for both muffle and crucible work, and taking a 9 by 16 inch muffle, and a California iron cylindrical furnace fulfilling the same conditions. The general laboratory is fairly well fitted for work in determinative mineralogy, and contains, in addition to a reasonable amount of reagents and chemical ware, an analytical balance and a button balance. The facilities for blowpipe work are also fairly good. As mentioned in the preceding section, in addition to the determination of the values of the fluxes and reagents used, a beginning has been made in firework and some valuable information has been obtained thereby. The work in the general laboratory has been rather limited for lack of time, but among the determinations accomplished were those of a number of coals from Australia, Japan, and the Philippines. A series of comparative coal assays were made at the request of Lieutenant Markham, Engineer Corps, U. S. Army, who had been detailed by the division commander, under instructions from the honorable Secretary of War, to report at as early a date as possible upon the coal deposits of these islands. Mr. Markham made a careful and painstaking study of the records upon the subject, including the report of the chief of the bureau to Major-General MacArthur in 1901, and he then visited the most important coal deposits, collecting data and samples.

Several of the latter were submitted to this bureau with a request that they be assayed, and a report be furnished upon them by the engineer. This work was done and a brief report was written by me to accompany the assay returns. A copy of Mr. Markham's valuable report and a copy of his map of Bataan have been given by him to the bureau for such use as might be to the good of the public service. A number of other coal assays were made by me and reported upon. The work in blow-piping has been the means by which many minerals submitted by collectors have been determined; and also by means of this rapid and inexpensive method of qualitative analysis the engineer has been enabled to reply to many letters asking for information.

In general the laboratories of the bureau are in better condition this year than they have been before and work in them has been interrupted only by pressure of work for the engineer elsewhere.

FIELD WORK.

The plan instituted by the bureau for the prosecution of field work for the obtaining of data concerning the geology and the mineral resources of these islands was first put into practice during the early part of this year. Appropriations and arrangements were made for a geological reconnoissance of the iron region of Angat, in the province of Bulacan, and a small party was organized and placed in charge of the engineer of the bureau, and the work was accomplished, the complete report bearing thereupon being submitted as a part of this annual report. This preliminary survey has cleared the way for later work in the field, and it is hoped that much more may be accomplished along the lines already laid out. It is believed that practical information, placed before those interested in the subject by absolutely impartial and disinterested officials of the insular government will be of real value in the development of the mineral resources of the Philippines. It is hoped, also, that the work of the engineers of this bureau in the field may contribute some information of worth to the sum of geological knowledge.

OFFICE WORK.

A varied amount of office work has been accomplished during the year. This has included correspondence with prospectors, mining and business men; the collecting and compiling of data bearing upon geological, mineralogical, and economic subjects; the working over of field notes, sketches, and specimens, and the translating and editing of valuable monographs, reports, and records from Spanish into English. In addition to the above, at the suggestion of the chief of the bureau, the first of a series of bulletins upon practical subjects to be issued by the mining bureau for free distribution was written by the engineer. This bulletin, No. 1, is upon Platinum and the Associated Rare Metals in Placer Formations, and is a modest attempt to answer in circular form many inquiries that have been coming into the office of the engineer during the past year. This bulletin was published by the printing bureau, and 1,500 copies are now ready for distribution. It is hoped that the series may be continued and that an amount of good proportionate to the expense of publication may accrue to those interested in the subjects treated. The work of the two draftsmen of the bureau has been valuable and uniformly satisfactory. A large number of maps, tracings, and copies have been made, and the appreciation of the engineer and this acknowledgment by him of their ability and fidelity is due to these two native employees who have accomplished so much that has been of importance to the work.

CONCLUSION AND RECOMMENDATIONS.

In conclusion I have the honor to recommend:

First. That the geological and mineralogical suryeys and the studies in the mineral resources of these islands, as planned by the bureau, be continued and facilitated, and that the equipment of the bureau for this work be made as complete as its importance would suggest.

Second. That the plans later to be recommended for the extending of the value and usefulness of the museum of the bureau be approved and that the necessary appropriations be made therefor.

Third. That upon the complete equipment of the government laboratories, as planned by the United States Philippine Commission, all chemical laboratory work for this bureau, excepting the qualitative determination of minerals by the blow-pipe, be performed therein.

Fourth. That the topographic survey work prelimary to geological platting be performed either by the bureau of public lands or by topographic engineers added to the force of the mining bureau to secure a proper and economic division and an increase in capacity of the work.

Fifth. That upon the extension of the geological survey work of the bureau, if approved, a competent palæontologist be added to the personnel of the survey.

Respectfully submitted.

HIRAM DRYER McCASKEY, B. S.,
Mining Engineer for the Mining Bureau.

APPENDIX L.

REPORT OF THE OFFICER IN CHARGE OF THE BUREAU OF PATENTS, COPYRIGHTS, AND TRADE-MARKS FOR THE YEAR ENDING AUGUST 31, 1902.

BUREAU OF PATENTS, COPYRIGHTS, AND TRADE-MARKS,
Intendencia, Manila, P. I., September 15, 1902.

Hon. DEAN C. WORCESTER,
Secretary of the Interior.

SIR: I have the honor to submit the following report of the bureau of patents, copyrights, and trade-marks for the period beginning July 1, 1901, and ending August 31, 1902.

The office of the bureau is in the Intendencia building.

There is but one clerk in this office, whose salary is $900 per year. This clerk, Jose Torres, a Filipino, has been in this office since shortly after its organization, and due to his knowledge of English, French, Spanish, and Tagalo, as well as typewriting, bookkeeping, etc., is well able to take charge of all the clerical work necessary for this office at this time. He is an intelligent, reliable, and industrious official.

Since July 1, 1901, 224 certified copies of United States patents and 84 certificates of registration of United States trade-marks have been duly received and filed in this office.

The receipts for the period above mentioned for filing certified copies of patents and trade-marks, and assignments of same, amount to $331.15, United States currency. To this sum should be added the sum of $259.50 Mexican currency, received in stamped paper for the annual payment on patents and the renewal of trade-marks granted by Spain and in force in these islands on the date of the American occupation of same, August 13, 1898.

The total number of United States patents duly received in this office since its organization amounts to 1,096. The number of United States trade-marks 552. There are about 3,000 Spanish patents on file in this office, 202 trade-marks, and 152 copyrights.

The Spanish law provided for an annual payment to the insular government on all patents granted in these islands. The following circular was published in the local newspapers and the annual progressive tax on but 10 patents have to this date been paid into this office.

Trade-marks under the Spanish law were granted for fifteen years with privilege of renewal for a further period of fifteen years, a tax of $12.50 (Mexican) in stamped paper being required at each time.

CIRCULAR }
No. 10. } OFFICE OF U. S. MILITARY GOVERNOR IN PHILIPPINE ISLANDS,
Manila, P. I., August 30, 1899.

Notice is hereby given to all holders of letters patent granted under Spanish law, who wish protection continued in these islands for said patents, that the requirements of the law under which said letters patent were granted must be complied with.

Payment of the annual progressive tax on said patent rights, as prescribed by article No. 13, royal decree of July 30, 1878, should be made at the office of patents, copyrights, and trade-marks.

By command of Major-General Otis:

THOMAS H. BARRY,
Assistant Adjutant-General.

In consideration of the prospect of modifications of the present laws governing patents, copyrights, and trade-marks in these islands, the following orders, circulars, and letters are published together for the first time.

The treaty of peace signed at Paris December 10, 1898, provides as follows:

ARTICLE 13. The rights of property secured by copyrights and patents, acquired by Spaniards in the islands of Cuba and in Porto Rico, the Philippines, and other ceded territories, at the time of the exchange of the ratifications of this treaty, shall continue to be respected. Spanish scientific, literary, and artistic works, not subversive of public order in the territories in question, shall continue to be admitted free of duty into such territories for the period of ten years, to be reckoned from the date of the exchange of ratification of this treaty.

Letter of the United States Attorney-General to the President:

WASHINGTON, D. C., *December 2, 1898.*

* * * * * * *

I think that the inhabitants of Hawaii are not at present, in the absence of affirmative legislation by Congress to that effect, entitled to the benefits of our copyright.

Porto Rico, Cuba, and Manila have not as yet been formally ceded to the United States. So far as they are subject to the control and Government of this country, they are ruled under the principle of belligerent right. They have not become entitled to the rights and privileges of citizens of the United States. In my opinion, when they shall have been directly ceded by treaty to the United States, and such treaty duly ratified by the Senate, their respective inhabitants will not be entitled to the benefit of the copyright laws unless the treaty by its terms confers such right or Congress shall afterwards extend such laws to the inhabitants of these countries.

JOHN W. GRIGGS, *Attorney-General.*

CIRCULAR No. 12.

WAR DEPARTMENT,
DIVISION OF CUSTOMS AND INSULAR AFFAIRS,
Washington, April 11, 1899.

The following is published for the information and guidance of all concerned:

In territory subject to military government by the military forces of the United States, owners of patents, including design patents, which have been issued, or which may hereafter be issued, and owners of trade-marks, prints, and labels duly registered in the United States Patent Office under the laws of the United States relating to the grant of patents and to the registration of trade-marks, prints, and labels, shall receive the protection accorded them in the United States under said laws; and an infringement of the rights secured by lawful issue of a patent or by registration of a trade-mark, print, or label shall subject the person or party guilty of such infringement to the liabilities created and imposed by the laws of the United States relating to said matters: *Provided*, That a duly certified copy of the patent or of the certificate of registration of the trade-mark, print, or label shall be filed in the office of the governor-general of the islands wherein such protection is desired: *And provided further*, That the rights of property in patents and trade-marks secured in the islands of Cuba, Porto Rico, the Philippines, and other ceded territory, to persons under Spanish laws, shall be respected in said territory, the same as if such laws were in full force and effect.

G. D. MEIKLEJOHN,
Acting Secretary of War.

CIRCULAR No. 21.

WAR DEPARTMENT,
DIVISION OF CUSTOMS AND INSULAR AFFAIRS,
Washington, June 1, 1899.

The following is published for the information and guidance of all concerned:

Parties who desire protection in territory under government of the military forces of the United States for patents, trade-marks, prints, or labels, as provided in Circular No. 12, Division of Customs and Insular Affairs, War Department, should forward a certified copy of the patent or of the certificate of registration of the trade-mark, print, or label, together with a letter of transmittal to the governor-general, requesting that such copy be filed in his office for reference.

Upon the receipt of such certified copy the governor-general will issue his formal receipt therefor and forward it to the party filing the same.

A fee of $1 will be charged for filing such copy, and should be inclosed with the letter of transmittal to the governor-general.

The requirements for filing under the provisions of Circular No. 12, above referred to, apply only to patents duly issued and to trade-marks, prints, or labels duly registered in the United States Patent Office under the laws of the United States. The only certification required is that issued by the Commissioner of Patents. Communications should be addressed to the governor-general of Cuba, Habana, Cuba; or governor-general of Porto Rico, San Juan, Porto Rico; or governor-general of the Philippine Islands, Manila, Philippine Islands.

G. D. MEIKLEJOHN,
Assistant Secretary of War.

GENERAL ORDERS, No. 24.

OFFICE OF U. S. MILITARY GOVERNOR IN PHILIPPINE ISLANDS,
Manila, P. I., June 26, 1899.

I. The offices of patents, of copyrights, and of trade-marks, heretofore administered as separate bureaus of the "Direccion general de administracion civil," are hereby consolidated into a single office, to be known as the office of patents, copyrights, and trade-marks, and placed in charge of Capt. George P. Ahern, Ninth United States Infantry, who will receipt to the Spanish authorities for all records, documents, and property pertaining thereto.

II. The duties enjoined in Circular No. 12, Division of Customs and Insular Affairs, in reference to the filing here of patents and trade-marks issued in the United States and duly registered in the United States Patent Office, and all duties which under the laws relating to patents, copyrights, and trade-marks applicable to the Philippines pertained to the "director-general de administracion civil" and his subordinates are hereby devolved upon the officer in charge of the office of patents, copyrights, and trade-marks above designated; all matters of administration arising in that office which under those laws required the action of any higher authority than the "director-general de administracion civil" will be forwarded for consideration and action to the office of the United States military governor in the Philippines.

III. So much of article 27 of the royal decree of October 26, 1888, regulating the concession and use of trade-marks as requires reference to the "Real Sociedad Economica" of industrial marks, designs, or models presented for registration, for investigation and report as to whether such marks, designs, or models are already in use or are the property of third persons, is hereby suspended.

By command of Major-General Otis:

THOMAS H. BARRY,
Assistant Adjutant-General.

CIRCULAR No. 34.

WAR DEPARTMENT,
DIVISION OF CUSTOMS AND INSULAR AFFAIRS,
Washington, September 25, 1899.

The following is published for the information and guidance of all concerned:

So much of Circular No. 21, of the Division of Customs and Insular Affairs, War Department, dated June 1, 1899, as requires the payment of a fee for filing certified copies of patents or certificates of registration of trade-marks, prints, or labels is hereby rescinded.

Said Circular No. 21 is hereby further amended by the addition thereto of the following paragraphs:

A power of attorney from the owner thereof authorizing another for him, and in his name, place, and stead, to file a certified copy of a patent or of the certificate of registration of a trade-mark, print, or label must be filed with such certified copy or certificate of registration in each of the islands wherein the protection of such patents, trade-marks, prints, or labels is desired.

Assignments of patents, trade-marks, prints, or labels, or certified copies thereof, must be filed in the same manner as herein provided for filing certified copies of patents and certificates of registration of trade-marks, prints, or labels.

G. D. MEIKLEJOHN,
Assistant Secretary of War.

[Copy of cablegram.]

WASHINGTON, D. C., *March 9, 1900.*

OTIS, Manila:

So much of circular 34, Division of Customs and Insular Affairs, as applies fees revoked.

MEIKLEJOHN.

[Copy of letter to Messrs. A. S. Watson & Co., Manila, P. I.]

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE,
Washington, D. C., March 5, 1900.

SIRS: This office is in receipt of your letter dated December 20, 1899, forwarded through the War Department, inclosing an application for the registration of a trade-mark, together with a money order for $25.80.

Under the trade-mark law trade-marks can be registered only to those owners who are domiciled in the United States or located in a foreign country or tribe which by treaty, convention, or law affords similar privileges to citizens of the United States. Under the decision of the Attorney-General of the United States dated December 2, 1898, the Philippine Islands are not a part of the United States, and therefore, although you may be doing business in Manila, your mark can not be registered on the ground that you are domiciled in the United States, and as this country has no treaty with the Philippine Islands nor with China, the country in which you state that you are domiciled, your trade-mark can not be registered in this office as requested.

The application papers, together with the money order, No. 25032, dated December 18, 1898, for $25.80, are returned herewith, and a copy of the trade-mark laws and rules of this office and of the opinion of the Attorney-General are forwarded to you.

Very respectfully, C. H. DUELL, *Commissioner.*

From the above it will be seen that, from the date of the American occupation up to the present time, residents of these islands have had no opportunity as such to receive protection for any patents or trade-marks they may own. Although the above circulars from the War Department provide a means for the protection in these islands of patents and trade-marks received from the United States Patent Office no provision is made for similar protection for United States copyrights.

The Filipino is not of an inventive turn of mind, and the lack of laws for the protection of new inventions in these islands has as far as this office knows worked no hardship on the natives. The few applications made since June, 1899, for patent right and for copyrights were made by Americans or Europeans. But when we come to the matter of trade-marks we find a great hardship being imposed on the business interests of the islands.

The American occupation brought with it the introduction of many articles of commerce new to these islands, and also a greater demand for certain articles long used here. New trade-marks naturally followed the successful marketing of these various articles, but there is no protection for said marks, and advantage has been taken of this to flood the market with spurious articles bearing trade-marks which deceive the average buyer.

The Spanish law protected trade-marks only after registration.

[Royal decree of October 30, 1888, regulating the concession and use of trade-marks in the Philippines.]

* * * * * * *

SECTION 4. Any manufacturer, merchant, agriculturist, or person engaged in industrial pursuits desiring to use, either individually or collectively, any special mark to designate his or their products, goods, raw agricultural products, or any other products whatever, or his or their cattle, as well as those desiring to preserve their property rights to any design or industrial pattern or model, are required to make due application for the certificate of ownership as provided by this decree. Whoever fails to obtain said patent is not entitled to use any marks or designation for his products or industry nor to prevent others from using his stamps or industrial designs.

The United States law looks on a trade-mark as property and registration of same as incidental only.

Property in trade-marks exists apart from statutes regulating their registration, and their validity is not dependent upon such statutes, except as expressly defined thereby. (46 Fed. Rep., 624 U. S., 598.)

Trade-marks may also be protected by State regulation. (Penal Code N. Y., 364–371, 128 Mo., 373.)

Registration is nothing more than prima facie evidence of ownership, and the validity of the title is always open to investigation in the courts. (22 Fed. Rep., 823.)

March 3, 1881, Congress passed what is now the trade-mark statute of the United States. It provides for the registration of trade-marks by citizens and aliens, provided the trade-mark offered for registration has been used in commerce with a foreign nation or an Indian tribe. All common-law rights of a trade-mark owner are expressly reserved by the statute. (See also act August 5, 1882.)

National registration is little used, except for the purpose of creating a permanent record of date, adoption, and use of trade-mark, and to give jurisdiction to United States courts.

I would respectfully recommend that a trade-mark law, based somewhat on the lines of the California trade-mark law, which is a good model to follow, be provided as soon as practicable, and that if possible new patent rights and copyrights be obtained by residents of these islands in the same manner as prescribed for citizens of the United States; that arrangements be made with the United States Patent Office and the Librarian of Congress whereby a competent official be sent from Washington to Manila for the purpose of examining all applications for patents and copyrights, and forwarding same to the Washington office. This official could also take charge of this bureau, practically making this office a branch of the Washington office as far as patents and copyrights are concerned. To grant such rights in these islands and also protect United States patents and copyrights granted in Washington and extended to these islands would lead to confusion.

It would lead to the possibility of different parties receiving rights for the Philippine Islands for identically the same articles.

This office is prepared to submit a draft of a new trade-mark law for these islands when called for.

Very respectfully,

GEORGE P. AHERN,
Captain, Ninth U. S. Infantry, in Charge of Bureau.

APPENDIX M.

REPORT OF THE SUPERINTENDENT OF GOVERNMENT LABORATORIES FOR THE YEAR ENDING AUGUST 31, 1902.

MANILA, P. I., *September 11, 1902.*

Hon. DEAN C. WORCESTER,
Secretary of the Interior, Manila, P. I.

SIR: In accordance with your request dated August 28, I have the honor to transmit herewith the "Annual report of the bureau of government laboratories," covering the period from the date of its organization to September 1, 1902.

ORGANIZATION.

On June 20, 1901, I received a cablegram from the secretary of the interior appointing me superintendent of government laboratories, which post was accepted on the following day, with the understanding that the position was to be taken by me during leave of absence from the University of Michigan.

In accordance with instructions, I visited a number of laboratories in the United States with which I was not familiar, especially in the cities of Washington, New York, and at Woods Hole, Mass., with the purpose of discovering available candidates for future positions and obtaining information not already on hand, to be used for the equipment and library of the Philippine laboratories. While engaged in these visits I also carefully compiled the lists of journals and manuals absolutely necessary for the beginning of a scientific library, and by consultation with a number of experts in work lying in fields outside of my own I also learned as much as possible in regard to the purchase of supplies in those branches with which I was not intimately familiar, and obtained a stock of catalogues of laboratory apparatus. With this equipment I left San Francisco on August 21, 1901, and reached Manila September 25, 1901.

Such government laboratories as existed in the Philippine Islands had been organized under the title of the "Municipal laboratory of Manila," in charge of Dr. W. J. Calvert, who had left for the United States before my arrival, and at the time of the actual organization of the government laboratories, there were present the following force: Irving C. Allen, chemist; Mariano Vivencio, assistant chemist; Dr. James W. Jobling, detailed from the Hospital Corps for biological work; Eizmendi Braulio, curator; Julian Bernal, laborer.

The small stock of apparatus and chemicals and the very meager library were stored on the ground floor of the building which had been rented for the use of the civil hospital, and no actual work was done for at least six weeks prior to my arrival, as the laboratories had been compelled to move from their previous quarters.

The first undertaking was to obtain some temporary building for laboratory purposes, as there were a number of analyses and bacteriological determinations which had been of necessity laid aside, and, after due consideration, the small building in the rear of the civil hospital at No. 781 calle Iris was rented and the necessary fixtures installed. As soon as possible orders were sent to America and Germany for the absolutely necessary journals and for such apparatus as could be accommodated in the laboratory space available.

As act 156 contemplated the planning and erection of a new laboratory structure, it was not deemed advisable to incur any great expense in connection with the temporary quarters, especially as it was hoped to be able to occupy the new building in the course of the next year. The lease of No. 781 Calle Iris was completed October 1, and by October 15 the laboratories were in a position to undertake certain kinds of routine work, such as the analysis of materials submitted by the custom-house, diagnostic analyses of urines for hospitals and physicians, and bacteriological examinations, and as soon as possible a circular to this effect was issued to the bureaus interested. From the beginning the board of health, custom-house, civil hospital, and the courts availed themselves of the opportunity offered, and the laboratory force found itself constantly busy with routine work.

The presence of plague in Manila and the attempted extermination of the rats by the board of health also soon brought upon the laboratory the duty of the diagnosis of all rats suspected of infection. The results of this work are appended in a special report.

Dr. R. P. Strong, director of the biological laboratory, reached Manila on January 1, and with his arrival the direction of all of the biological work was undertaken by him. An addition was now built to accommodate the government photographer, and another to give additional space for the biological and chemical work, and during the year the laboratory force has been augmented, until it now has the following employees: P. L. Sherman, chemist and investigator; Irving C. Allen, chemist; Charles L. Bliss, physiological chemist; Paul L. Stangl, analytical chemist; John H. Thigpen, assistant chemist; Mariano Vivencio, assistant chemist; Norman E. Williamson, assistant biologist; Moses T. Clegg, assistant bacteriologist; Charles Martin, photographer; H. S. Peabody, stenographer and clerk; Mary Polk, stenographer; Epifanio Saguil, clerk; Julian Bernal, janitor; Juan Diego, Silbino Peño, Gabino Rontaso, Simon de Garcia, Antonio Pecho, Sabino Baiguin, Nozario Lunabas, laborers.

The present quarters, in spite of every effort to make the best of the material on hand, are entirely inadequate for any extended work, and, as a consequence, the details for a new structure, together with those for the necessary equipment, have been pushed as rapidly as possible. Sketch plans of a suitable building were prepared by the superintendent of government laboratories and submitted to the bureau of architecture. The delay in properly equipping the latter bureau necessarily retarded the elaboration of these drawings, but active building operations were not interfered with in consequence, because the length of time required to procure a title to the land to be occupied by the new structure exceeded that needed for the completion of the plans. The drawings presented by the government architect embody all of the details needed to construct and thoroughly equip a modern laboratory and, by cooperation between the bureaus of government laboratories and architecture, a result has been produced which will be a credit to the Philippine Islands when completed, and which will enable all kinds of work to be carried on.

Plans of Laboratory Building.

The new building is planned to provide laboratory space for the chemical and biological laboratories and the serum institute. In order to accommodate all lines of work necessary in the Philippine Islands, the building will be divided into 60 rooms.

The plan of separating each class of work from the others was adopted after mature consideration and for the following reasons: The laboratory is not intended as an institution for instruction; consequently large rooms, capable of accommodating students, are not necessary. It is considered good policy in some laboratory plans to unite several smaller rooms into one, throwing a larger number of workers together for the purposes of contact of work and the exchange of views. While this would seem to be very advisable in the construction of laboratories in which all of the workers are not fully trained, it is not advantageous in a building where the laboratory work is so largely technical and where each line can be sharply differentiated and assigned to certain well-equipped employees. Each class of work will then have a separate space allotted to it and will not interfere with the other lines being carried on. The additional expense of building partitions is not great and the loss of floor space is nothing. Government work in a building planned after the design of the new laboratory can be conducted efficiently and with no interference between the various branches.

The chemical laboratory, experience has shown, must, in the Philippine Islands, provide space for the analysis of minerals, mineral products and rocks, of water, soils, food products, paints, oils, beverages, and other materials. In addition, it is necessary to investigate the natural resources of the islands and discover means of improving the products and, if possible, to develop new resources and industries. With this end in view, rooms must also be provided for distillation, for the examination of plant products, and for work in pharmacology, so that the actual value of supposed medicinal plants can be decided on the spot where materials are at hand and fresh.

The routine work of the biological laboratory involves diagnostic analysis, bacteriological and otherwise, for the various hospitals, municipal physicians, board of health, police force, and other government institutions as may have occasion for such services. As this work is quite extensive, considerable space must be allowed for bacteriological diagnosis. The investigation of tropical diseases and the pathological changes brought about by them, both in human beings and in domestic animals, requires the construction of several rooms for the study of their causation and to accommodate pathology and physiology. The plans of the laboratories have been drawn so as to accommodate all of the work within one building, one-half of which will be occupied by the chemical and the other half by the biological laboratory, with store rooms and photographer's rooms held in common.

The necessary floor space is given by a building 216 feet long and 60 feet wide, having two stories. The laboratory desks are all to be provided with gas and water and, where necessary, with steam and vacuum. Each room is also to have a hood under which work either with noxious or dangerous chemical substances or with bacteriological products which need isolation may be carried out. The ventilation for these hoods is to be provided by fans.

The desk space, the number of sinks, water, gas, steam, and vacuum taps have been calculated, so as to accommodate a number of workers sufficient to meet the needs of the government for many years to come, and in locating the laboratory fixtures as much attention as possible has been paid to economy of space and construction consistent with good workmanship and convenience. Nothing has been added which, judging by present indications, will not be absolutely necessary for the carrying on of some line of work or investigation.

The condition of the weights and measures in the Philippine Islands has demonstrated the necessity of some institution in which standards of weights and measures can be adjusted, and, with this end in view, a portion of the ground floor of the chemical wing has been set aside for a physical laboratory which will be equipped for gravimetric, volumetric, thermometric, and photometric work and for electrical measurements. This institution would practically constitute a bureau of weights and measures for the islands and it will also afford a physical laboratory for the necessary investigations connected with the chemical work carried on in the other rooms of the building.

The power to light this building, and to furnish vacuum, steam, and water to the desks, and to supply the various motors which will be needed for the laboratory machines is to be provided by a 75-horsepower boiler and at present by one 35-kilowatt dynamo. This plant is deemed adequate, at present, not only to take care of the laboratories, but also of the other government structures which may be built in the neighborhood. The boilers and engines are to be housed in an addition 115 feet long and 68 feet wide to be built in the rear of the laboratory structure proper, and in this addition space has also been found for the laboratory of the serum institute and for the refrigerating room necessary for the preservation of serums and prophylactics and such chemicals and supplies as need to be stored in the cold. The capacity of the serum institute will be such as to supply the entire archipelago.

It has not been deemed advisable to include animal rooms in the building proper, because ground is at hand on which to isolate the animals and avoid the unpleasant features usual in laboratories where space is crowded. Two houses for the accommodation of small animals are to be built in the rear of the laboratory building, one of which will be for the use of the laboratory proper and the other for the serum institute. The construction will be such as to present conditions under which the animals can breed and multiply. This will enable the laboratories to keep a constant and sufficient supply on hand, a matter with which much difficulty is connected at present. The larger stables, necessary for the serum and vaccine institute, will be constructed farther to the rear and be planned upon modern hygienic principles. When the building is completed it certainly will provide facilities which will render the scientific work contemplated in the Philippine Islands independent of outside assistance.

The details of the building have been planned by Mr. E. K. Bourne, and will be discussed in the report of the bureau of architecture.

FACILITIES AFFORDED INVESTIGATORS FROM ABROAD.

In planning the new laboratory building and in purchasing apparatus, an important circumstance, adding to the value of the laboratories for the Philippine government, has been kept in mind. It is believed that the fertility of the field for the investigation of tropical diseases and of chemical problems which can only be carried out here, will offer a great attraction to scientific men of high standing. Of late years the desire for the development of science in the Tropics has grown among the thoroughly trained men in the laboratories both of Europe and America, but the facilities for investigation have heretofore been furnished chiefly by equipping and organizing expeditions, the outfit of which must necessarily be limited, owing to the large cost of supplying temporary laboratories, and to their migratory nature.

These drawbacks to thorough work would be eliminated provided the Philippine government laboratories could supply facilities and room for such scientific expeditions, and it is thoroughly believed that as soon as the announcement of the complete equipment of the institution is made it will be possible, for limited periods, to draw on the best research talent in the world, without any greater expense to the government than the cost of transportation, and possibly of the living expenses of the men while here. The result of such investigations would be of inestimable value to the islands, and by the means proposed the services of men who otherwise would not possibly think of coming without large salaries or without an expensive allowance for the equipment of an expedition, can be secured. The plans of the insular architect will show the location and character of the rooms set aside for this class of work.

THE REFERENCE LIBRARY.

A necessary feature of scientific investigation is an adequate reference library, and it goes without saying that the bureau of government laboratories must be equipped with such an adjunct to work. The building plans have reserved a space in a central location which will be capable of easily accommodating 30,000 volumes. By means of subscriptions to scientific periodicals, the gradual accumulation of complete sets as funds are made available, and by the purchase of modern manuals, it is hoped in the course of three or four years to have a working library sufficient to meet the demands which will be made upon it. This plan contemplates provision for biological (including medicine), chemical, pharmacological, pharmaceutical, toxicological, and physical literature, together with the necessary works on botany and zoology not especially provided for in those bureaus having botanists and zoologists under their immediate direction.

The library will not be solely for the private use of the laboratory, but will be open to such of the public as care to avail themselves of its privileges under the library rules which will be adopted. The inestimable advantage to the medical profession of the Philippine Islands, of an adequate library, alone would justify the expenditure, apart from all other considerations, and when in addition the library will furnish all the working material for the bureau of government laboratories and a large proportion of the allied bureaus, its absolute necessity will at once become apparent. A competent librarian will be engaged and modern methods of cataloguing will be adopted as soon as a sufficient number of books are on hand to warrant the expense. At the present time, no library room is available in the temporary building and an addition to the present quarters is necessary at the earliest possible moment.

APPARATUS AND SUPPLIES.

The estimates for apparatus and supplies were previously submitted to the honorable the secretary of the interior, and the individual items of this list have been carefully compiled in such a way as to avoid all purchases which by a careful review of the field are demonstrated to be actually unnecessary within the first year, but the equipment, if purchased as originally planned, is such that all operations which can be foreseen at present will be carried on. In the present plans, one room has been provided with apparatus for distillation, extraction, filtration, precipitation, and other classes of work on a reasonably large scale, so as to afford sufficient materials for experimentation.

In connection with the apparatus lists, but not included therein, are the necessary lathes, shapers, and tools for an instrument maker. Experience in all laboratories has demonstrated the necessity of a mechanic on the ground, and this is especially true in so remote a region as the Philippine Islands, where even the simplest repairs to finer apparatus, such as microscopes and balances, can not be executed. The services of a glass blower for the purpose of constructing glassware not to be purchased in the market, and for the repair of such delicate pieces as are sure to become broken in the course of a year, will also be necessary, and provision has been made for this branch of mechanical work. One difficulty in conducting laboratory work in Manila is the lack of a municipal gas supply. As a consequence, makeshifts must be resorted to. Gasoline, experience has shown, is unsatisfactory in the Tropics, acetylene produces a small, very hot, and pointed flame, which cracks glassware. Both these means of laboratory heating have been tried within the past year. A type of gas apparatus, manufacturing illuminating gas from cocoanut oil, is constructed in Manchester, England, and one such machine is at present in Manila, and for sale. It is the intention of the bureau of government laboratories to purchase this machine and install it in the temporary building. By this means it will be given a thorough trial before the new structure is completed, and, if found satisfactory, will be adopted for permanent use. The complete apparatus is of sufficient capacity to supply the future needs if a new and larger gas holder is constructed.

THE BUREAU OF WEIGHTS AND MEASURES.

As was mentioned in the discussion of the plan of the building, a space has been set apart for a physical laboratory, and as the equipment of this branch of the service will be at present the only one of the kind in the islands, and as the establishment of another laboratory in the future would seem unnecessary and a duplication of expense without any adequate return, it is urgently recommended that the charge of weights and measures of the islands be intrusted to the bureau of government laboratories, when it is prepared to undertake the work, which will be as soon as the building is completed. Weights and measures, as well as electrometric, photometric, and thermometric apparatus, will be secured by the bureau of government laboratories, and it will not only establish standards for the use of the government, but will also undertake, for a moderate cost, the mensuration of apparatus belonging to private individuals and corporations on the same principle as is now being done in Berlin by the Reichsanstalt, and in Washington by the Bureau of Weights and Measures. It is believed that the income derived from this class of work will ultimately fully pay for the expense of the physical laboratory.

THE SERUM INSTITUTE.

The institutes for the preparation of prophylactic serums and of vaccine virus are at present under the control of the board of health. A temporary institute has been constructed at San Lazaro, comprising a small laboratory, sheds for vaccine calves, horses, and cattle, and fenced inclosures for isolating animals which are under treatment. The work of preparing serums has been begun, and, as far as possible, will be pushed in the present quarters. The new laboratory building will, however, supply facilities which it is impossible to secure in a separate location without great expense, and consequently a modern serum plant has been provided for in the new quarters. As the work in this direction is so closely allied with laboratory work in general, it would be expedient to combine the serum and vaccine institutes with the government laboratories, in charge of a director.

There is no branch of the laboratory work in which an expenditure sufficient to obtain an adequate equipment and to purchase and maintain the necessary animals will more surely bring returns in the near future. The prevalence of rinderpest in the islands has rendered the importation of fresh stock so hazardous an undertaking that the future of the agricultural interests is gloomy, unless some remedy can be procured. This remedy can alone be supplied by a well-organized serum institute which will be able to furnish prophylactic serum in sufficient quantity to immunize all imported cattle immediately upon their arrival in the islands. To do this it is estimated that a herd of some 100 to 150 government cattle will ultimately be needed. The number of trained workers in this undertaking will need to be increased from time to time, as new cattle are procured. At present the herd consists of 18 head; the employees are a director and assistant director. The necessity of good vaccine virus has already been demonstrated, and the vaccine institute in charge of the director of the serum institute can, with but slightly increased facilities, supply the entire demand. With an equipment sufficient to successfully combat rinderpest, the serum institute will also be able to supply antipestic, antidiphtheritic, and other prophylactic serum at but slight additional expense.

PLAN OF EMPLOYEES OF THE BUREAU OF GOVERNMENT LABORATORIES.

According to a plan furnished the honorable secretary of the interior on March 18, 1902, the employees of the laboratories when the new laboratory is completed and ready for occupancy should be as follows:

Superintendent of government laboratories	$4,000
Animal parasitologist	2,500
Plant pathologist	2,500
Physical chemist	2,400
Pathologist	2,400
Chemist and investigator	2,000
Analytical chemist for mineral analysis and mineralogist	2,000
Analytical chemist	1,800
Physiological chemist	1,800
Pathologist	1,800
Entomologist	1,800
Drug assayer and toxocologist	1,800
Engineer and electrician	1,600
Assistant biologist	1,500
Assistant bacteriologist	1,500
Property clerk	1,500
Assayer	1,500
Soil and water analyst	1,500
Two stenographers, each at	1,400
Mechanic and instrument maker	1,400
Chemist and food analyst	1,200
Assistant chemist	$1,200
Photographer	1,200
Assistant engineer	1,200
Clerk	1,020
Anatomical artist	900
Glass blower	900
Librarian	900
Storekeeper	900
Preparator of culture media	600
Curator	600
Curator	300
Janitor	240
Servant	240
Caretaker	240
Three oilers, each at	150
Four stokers, each at	150
Two messengers, each at	150
Two servants for storekeeper, each at	150
Two laboratory assistants, each at	150
Eight servants, each at	90
Four laborers, each at	90

THE CHEMICAL LABORATORY.

The construction and maintenance of adequate chemical laboratories in conjunction with various lines of government scientific work, has, since the famous relationship between the French revolutionary government and the chemists charged by them with the production of explosives, gradually become a recognized necessity with all civilized nations. In many countries such institutions have sprung up gradually, as the exigencies of the case required, in conjunction with undertakings which have been inaugurated from time to time. This method has resulted in the growth of numerous separate laboratories, each in part devoted to some especial line, but all overlapping and duplicating each other to a greater or less extent, because the apparatus and training required in one is to a certain degree identical with that needed in others. Laboratories connected with agricultural work, making examinations of soils and foodstuffs would necessarily encounter many questions which could equally well be settled by those devoted to forestry, geology, or mineralogy. Biologists and pathologists, in modern times, have a constantly increasing call for chemical knowledge, with the result that institutions with which they are connected soon begin to develop chemical laboratories, and so the reduplication goes on as each branch of science begins to feel the need of such an adjunct to its work. Such a condition of affairs can be avoided at the outset by the construction of one central institution, which will combine the facilities necessary to all with such special apparatus and expert talent as are needed by the individual lines of work. This aim has been kept in view in the plan of the laboratory force and new building so that although the expense when concentrated in a single estimate may seem somewhat high, yet it must be borne in mind that with any other plan a much greater outlay would be spread over various bureaus without becoming so apparent.

Government chemical laboratories being a necessity, it is obviously economical to concentrate all of them under one head and to provide adequately for their efficiency and success. In no branch of modern science, except it be physics, is a full equipment of modern apparatus and appliances a greater essential to successful work than it is in chemistry. In former times, when the science was more elementary and when the demands on the variety of resource of the worker and the need of accuracy and above all the speed of work were much less, a smaller equipment would do, but at present many essential features of knowledge are demanded and many operations conducted which were then impossible. Inadequate equipment is to-day the poorest economy in a chemical laboratory because the salary list, being a continued outlay, is the most expensive part of the institution; so that the greater the number of labor-saving devices there are in use, the greater will be the amount of work turned out and the smaller the working force necessary to do it. Analyses which formerly took weeks can now, with proper means, be done in as many days, and important conclusions can now be reached in a short time by means of some modern instrument of precision, which formerly were arrived at by tedious experimentation, if, indeed, the desired result could be accomplished at all. It must further be borne in mind that many lines of work which are of fundamental importance to the financial welfare of the islands can not be undertaken at all without proper means and appliances.

The present laboratory is a makeshift, allowing only of the simpler kind of chemical work, and the lack of apparatus has materially increased the time necessary to reach results; the ingenuity and patience of the working force has been taxed to accomplish at all what under other circumstances would have been done with facility and rapidity. The hope of a new and suitable building in the near future has, however, made it easier to undertake work, and the entire laboratory force has endeavored to do what it could with the materials on hand.

The efficiency of a laboratory depends upon the skill and technical training of the men in it, as well as upon their general intelligence. The Philippine Islands offer no material really fit properly to fill scientific positions in a chemical laboratory, and such candidates as are available, no matter what they imagine themselves to be, do not really have sufficiently wide experience or systematic knowledge to enable them satisfactorily to fill the vacant positions. In routine work absolute accuracy and honesty are prime essentials; even one erroneous result returned, say, to the custom-house, might entail a change of many dollars in duties. The director of the chemical laboratory must be able to rely perfectly upon the reports of his subordinates, and in order to make such reliance possible, the laboratory force must be of a high order. Realizing this fact, the bureau of government laboratories entered into negotiations with the civil-service bureau with a view of establishing a list of eligibles for the various laboratory positions, ranging in salary from $1,500 to $2,000 a year. Examinations have been held in the United States, but the results have shown that, with the exception of one man, who had been previously recommended and had agreed to try the examinations, the applicants do not come from the best-trained scientific circles. Chemists with any prospects at home do not consider the salaries a sufficient inducement, and the candidates have been young graduates just on the threshold of their careers, or in some cases even men who have not completed a thorough chemical course anywhere. It is possible that in time, as the knowledge of the improved facilities for work in the Philippines becomes more general in American scientific circles, better equipped men will apply for positions; but it is also possible that larger inducements must be offered.

The routine work of the laboratory for the past year is given by the following table:

Report of routine work in chemical laboratory.

Subjects.	Miscellaneous.[a]	Custom-house.	Mining bureau.	Bureau of forestry.	Bureau of architecture.	Civil hospital.	Board of health.	Court of first instance.	Police department.	Insular purchasing agent.	Bureau of agriculture.	Bilibid prison.	Total.
Paints		89											89
Liquors	4	24					3						31
Oils		25											25
Glycerin		1											1
Foods		5					1						6
Textile fabrics		11											11
Miscellaneous		15											15
Custom-house decisions		8											8
Minerals	3												3
Coals	5		10										15
Iron ores			5										5
Limestones			3										3
Soils	3			3	1						1		8
Wood extract				1									1
Stone					1								1
Urines	133					183			2			1	319
Carabao and cow milk	8					1	2						11
Suspected poisoning						1		1	1				3
Waters	5						1						6
Coffee										1			1
Human milk	2												2
Salt	1												1
Gastric juice	2												2
Contents of stomach	1												1
Fæces	1												1
Disinfectants	5												5
Total	173	178	18	4	2	185	7	1	3	1	1	1	574

[a] Including analyses for the bureau of government laboratories, police, municipal physicians, etc.

The chemical laboratory undertook the manufacture of benzoylacetyl peroxide (benzozone or acetozone) and its experimental introduction in the Philippines as an intestinal antiseptic. In all about 3 kilos of the crystalline product had been used up to June 30, 1,350 liters of 1-1,000 solution were prepared and distributed, and about 3,000 capsules given out. The work of making the peroxide still continues, and experiments with it in new fields are being undertaken. A detailed report as to the preparation and use of this antiseptic in the various cholera hospitals and in dysentery is appended; the results in other lines are not as yet sufficiently complete to warrant publication.

The most extended work in routine analyses undertaken by the chemical laboratory up to the present time has been for the custom-house and mining bureau.

ANALYSES OF IRON ORES AND LIMESTONES.

The mining bureau transmitted an interesting series of iron ores from the old Hison and the Constancia mines at Angat, Bulacan. Three of these were ores which are at present being worked and smelted, and one of them, a specular iron ore, shows a very high value. This was used in the Hison mine, at Angat, Bulacan, and one of the others, from the Constancia mine, is very nearly equal to it in value. In a sample of hematite over 1 per cent of cobalt was encountered. The complete analyses given in the report of the mining bureau demonstrate the necessity of a careful mineralogical review of these regions, the presence of cobalt rendering likely the subsequent appearance of nickel. An analysis of a sample of slag, which was taken from one of the smelters using ores from these mines, shows that the native processes are crude and wasteful. The relationship between the government laboratories and the mining bureau is such as to render systematic work in mineralogical investigations possible in the future and the plans of the new laboratories provide for a location in which not only mineral analyses can be conducted, but in which crystallographical and petrographical work can be carried on.

Once inaugurated, the importance of this work is such as to warrant a considerable outlay of time and energy. The beginning of the systematic mineralogical review of the region in Bulacan is found not only in the five analyses of iron ores reported upon, but also in the examination of several samples of limestone from the Bayabas River, Bulacan, coming from a formation composed of a series of beds well exposed, near the Santa Margarita spring. One of these limestones is of considerable value, from a metallurgist's or cement maker's standpoint, if it is present in sufficient quantities. It contains only 1 per cent of magnesia, 6 per cent of aluminum, with small amounts of other impurities. The other two limestones, while somewhat higher in calcium carbonate, are also considerable higher in magnesia and might, for this reason, not be as well adapted for some purposes, although just as valuable for others. The complete analyses of such complex minerals as the iron ores and limestones have proven themselves to be, involves a large expenditure of time with the present facilities and laboratory force, and owing to stress of other work the analyst assigned to these samples was not able to put his time uninterruptedly upon them. This condition will be altered in the future, when the laboratory will be able to take care of all of this work coming to it through systematic efforts in collecting material.

Several samples of waters taken from the hot springs at Itogon and Tuel were examined in the course of the year, because it is the opinion of the natives of Benguet that these waters have a high medicinal value. The analyses show that such is not the case, the mineral contents being no more than might ordinarily be found in any average spring water, and any therapeutic value which may be assigned to them is due only to the temperature.

The other routine analyses do not need a special mention. A glance at the table will show that they cover a large field and that eleven bureaus have availed themselves of the opportunities afforded.

The following extracts from a letter from Mr. R. Vorfeld, acting chief of the appraiser's division, will serve to show the importance of the bureau of government laboratories to the custom-house:

> * * * Even prior to the enactment of the tariff law now in effect in the Philippine Islands, and as soon as the officers charged with the appraisement of merchandise acquired a more thorough technical knowledge of the same, the importance of a chemical laboratory as an adjunct to the customs service became apparent. About two years ago the advisability of establishing a separate customs laboratory was considered, but this plan was abandoned as soon as it was realized that the necessities of the service would not justify the equipment and maintenance of a separate laboratory. When, on the 15th of November, 1901, the customs tariff for the Philippine Archipelago was declared in effect, the bureau of government laboratories had been established and was prepared to render the customs service the required assistance. The tariff at present in force, enacted along more modern lines than the old or Spanish tariff, of which the United States provisional customs tariff and regulations were a translation, gave rise to many contingencies which made laboratory assistance imperative. In several instances the rate of duty provided for certain articles of merchandise is made subservient to the results of a chemical analysis, and an appraisal of the substance can not be made without recourse to such an operation. The application of rule 15 of the tariff provides much material for chemical analysis, as in many cases mixed component materials are so nicely balanced that the "component material of chief value" must be determined by chemical examination. The greater number of customs analyses are made for the protection of the revenues when protests against classifications are entered. Others, however, are made pursuant to the request of importers before examination. * * *

(*a*) Samples forwarded and reported upon prior to January 1, 1902:

Liquors (for statistical purposes)	19
Fats (butters)	4
Textile fabrics	3
Miscellaneous	2
Total	28

(*b*) Samples forwarded and reported upon since January 1, 1902 (recorded in the "Record of analytical examinations"):[a]

Paints	77
Liquors	5
Mineral oils and schist products	23
Other oils and fats	2
Textile fabrics	2
Metal compositions	12
Miscellaneous	1
Total	122

In addition to the above-reported number of analyses, the superintendent has, on request, rendered the following opinions on the mentioned subjects:

(*c*) Opinions rendered by the superintendent:

On definition of metallic paints	1
On faïence, clay, and similar wares	1
On ordinary and fine toilet soaps	1
On schist products and mineral oils	1
On liquified anhydrous ammonia	2
On malted milk and similar invalid foods	1
On crucible steel	1
Total	8

* * * The samples which have been forwarded for analysis are mostly types—that is, a paint of a certain brand is analyzed once upon first importation, the result registered, and the established classification serves for all subsequent importations of that brand. Only control samples are taken and subjected to analysis from time to time to guard against possible misrepresentation. * * * Between December 1, 1901, and June 30, 1902, 52,248 kilos of zinc colors were imported, both dry and prepared. Dry zinc oxide is, however, only imported by the local drug firms, and its importation is estimated not to exceed 6,000 kilos yearly. This would leave 48,248 kilos of prepared zinc paints. Of the 77 samples of paints reported as having been forwarded for analysis, 35 were zinc colors, of which 19, or 54.3 per cent, contained the materials (barytes, chalk, or terra alba) that caused a surtax of 50 per cent over the regular rate of $5 per 100 kilos to be applied.

During the same period 578,360 kilos of other metallic colors were imported. Estimating that 60 per cent of that amount were prepared, 361,016 kilos of prepared colors were analyzed, and 29, or 78.4 per cent, contained the substances for which a surtax is provided. Instead of $3 and $5 per 100 kilos, these paints paid $5 per 100 kilos, plus a surtax of 50 per cent.

GUTTA-PERCHA, GUTTA, AND RUBBER.

The laboratories undertook the investigation of various samples of Philippine gutta-perchas and rubbers. The work was in charge of Dr. P. L. Sherman, who submits the following report:

On the completion of my investigations of rubber and gutta-percha in Java and the Straits Settlements, and later on in southern Mindanao and the Sulu Archipelago, I was ordered transferred on May 15 from the forestry bureau, under the instructions of which the investigations were made, to the bureau of government laboratories, in order that further examinations, both physical and chemical, might be made of specimens of gutta-percha and rubber previously collected.

PHYSICAL AND CHEMICAL ANALYSES OF THE GUTTA-PERCHA AND RUBBER OF THE PHILIPPINE ISLANDS.

GEOGRAPHICAL DISTRIBUTION.

From the southern part of Paragua on the west and the southern part of Mindanao on the south and east, and as far as Benguet to the north, gutta-percha and rubber producing trees and vines have been reported present and growing luxuriantly. According to Spanish botanists, the following were found and named:

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[a] To July 1, 1902.

Name.	Locality.	Product.
Ficus elastica, Nois	Manila and many localities south	Rubber.
Palaquium latifolium, Blanco	Vicinity of Davao and as far north as Tarlac Province.	Gutta-percha.
Palaquium luzonensis, Vid	Mindanao	Do.
Balete	Throughout the archipelago	Gum.
Artocarpus elastica, Mig	Mindanao	Rubber.
Artocarpus incisa, Lin		
Ficus concenner, Mig	Throughout the archipelago	Do.
Ficus superbus, Mig	Western Mindanao	Do.
Alstonia scholaris, R. Br	Mindanao	Gum.
Ficus radiata, Deve	do	Rubber.
Ficus radicans, Roxb	do	Do.
Ficus britrianensis, Garc	do	Do.

Besides these, trees producing gutta-percha or a closely allied product have been reported from Tayabas Province and the islands of Sibuyan, Negros, and Cebu. In Sibuyan, as well as in Benguet, a large vine giving a peculiar gum or rubber has also been reported, but so far it is not known if the vines encountered in these localities are the same as those given in the above list, nor have they been identified botanically.

While it is not expected that the plants tabulated above produce products of high commercial value only, yet it can safely be assumed that all of the species of trees and vines throughout the islands which give gutta-percha, rubber, and allied products are not included. This is shown by the fact that of five different species of gutta-percha producing trees and one rubber vine which I collected on my trip of investigation last year in the Sulu Archipelago and Mindanao, most or all appear to be unknown botanically. These considerations pointed to the conclusion that the islands are unusually rich in this class of trees and vines, and therefore nothing definite could be stated regarding the resources of the Philippines in this respect until reliable specimens of the products had been collected from the different species and tested physically and chemically. This work was undertaken by the bureau of government laboratories.

The principal object being to determine the commercial and economic value of the gutta-percha and rubber now gathered and exported from the Philippines, I began by investigating the specimens taken either from sample lots ready for exportation from the southern ports, or else gathered by myself from the trees and vines recognized by the natives as producing the gutta-percha and rubber of commerce. By this means I hope to show: First. Of what the gutta-percha and rubber as exported from the Southern Philippines consists. Second. If the commercial articles are as good as can be obtained; in other words, if unadulterated, or if some species of trees or vines do not contain better gutta-percha and rubber than are handled commercially.

Samples of Gutta-percha and Rubber Secured for Analysis.

Judging from our proximity to Borneo and the Dutch East Indies, we might suppose that the methods for gathering gutta-percha and rubber practiced by the wild mountain tribes there would cross over to the Philippines simultaneously with a demand for those products. So far as reading and personal observations go, we may assert that we not only have the Borneo methods, but indeed these so modified as to be worse even than the original. In general, those adopted by the Moros of Mindanao and the Sulu Archipelago are all based on the plan of cutting down the trees or vines in the first place, and then, by incisions in the bark made in a variety of ways, of securing as much milk as possible without too much work or too many precautions being taken to save a large proportion from being lost. After the milk is gathered it is coagulated by mixing with sea water or boiling and the resulting product worked into balls and rolls along with dirt and bark and sold to Chinese buyers in the seaport towns of the southern islands for exportation to Singapore. After visiting most of the towns of the southern islands from which these products are exported, I found them to come from the following regions:

1. The Sulu Archipelago.
2. Subano.
3. Biñang.
4. Talayan.
5. Davao.

The last four regions are in Mindanao and practically embrace all the mountain chains and forests along the southern coast from Zamboanga to Davao.

For analysis I took samples from all of the regions above mentioned, except the last (no good samples being obtainable at the time of my trip), and in addition secured the product from five different gutta-percha-producing trees and one rubber-producing vine, care being taken to keep the samples as free as possible from dirt and admixture with the milk of any other tree. These six different species, while probably not the only ones producing the gutta-percha and rubber now being collected in the Philippines, are, nevertheless, according to the native collectors, the principal ones, and the following analyses bear out their assertion:

CHEMICAL AND PHYSICAL EXAMINATION OF GUTTA-PERCHA AND RUBBER.

I. GUTTA-PERCHA.

To fulfill its object from a commercial and economic, rather than a purely scientific standpoint, a physical and chemical examination of gutta-percha should answer the following questions:

1. What are the component parts of this compound?
2. In what proportion are these parts present?
3. Are they the same as are found in the best grades of gutta-percha or are they of inferior grade?

Knowing these facts it is easy to put the gutta-percha examined in its proper place. The sample of gutta-percha selected as a standard (see sample No. 1) was taken from a gutta-percha tree (*Dichopsis gutta*), and is recognized by all experts and cable companies as the best grade of gutta-percha obtainable. This with the samples of Philippine gutta-percha were submitted to identical methods of chemical analyses, with the following results:

Table of analyses of various Singapore and Philippine gutta-perchas, showing composition and comparison.

Source of specimen.	Appearance.	Dirt.	Gutta.	Resins.	Water.	Ratio resins to gutta.
		Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	
1. Collected by Dutch officials in charge of the government gutta-percha plantation, Java, from trees of species Dichopsis gutta, and considered a fair sample of best gutta-percha.	Close, compact, tough; whitish to pink and brown.	1.99	74.77	20.74	2.49	1:3.6
2. Product from two trees of the same species growing close together, island of Tawi-Tawi, southern central coast. Considered by Moros as superior grade.	White, somewhat elastic; very tough.	2.05	48.19	41.38	6.59	1:1.15
3. Purchased from Moros at Bongao. Gathered in Tawi-Tawi. Considered second grade.	Tough, compact slab; brownish red.	15.83	28.60	37.42	18.32	1:0.7
4. Product from large tree in mountains southeast of Cotabato, Mindanao. Considered first grade.	Somewhat tough; white, pinkish, and brown.	2.72	38.42	49.08	9.76	1:0.78
5. Product from tree in mountains southeast of Cotabato. Considered second grade.	Inclined to crumble; color, white to brownish.	16.79	31.30	51.86	.04	1:0.6
6. Product from tree in mountains southeast of Cotabato. Considered third grade.	Dark brown; hard and crumbling.	8.48	23.64	53.99	13.87	1:0.43
7. Brought into Cotabato by Moros from Binang region, and declared by Chinese a second grade.	Long coils on piece of bamboo; dirty and dark colored.	4.60	30.20	57.40	7.80	1:0.52
8. Product from large tree growing along Spanish trocha, north of Tukuran, Mindanao. Considered third grade.	Heavy, compact mass, crumbling easily; light reddish brown.	17.04	24.55	43.21	15.19	1:0.56
9. Brought into Cotabato by the Moros from the Subano region northwest of Tukuran, Mindanao. Considered by Chinese merchants to be the finest grade.	Clean, pinkish balls, size of croquet balls; rather tough.	5.76	32.49	54.08	7.61	1:0.6

EXPLANATION OF TABLE.

From the foregoing description of the manner adopted by the Moros for gathering gutta-percha, it may be surmised that no great precautions are taken to keep it clean. In fact, a plentiful amount of chipped bark, water, coloring matter, and other impurities are allowed to fall into the milk, and through coagulation become intimately mixed with it. The chemical examination of gutta-perchas reveals them to be composed of many bodies, which may be grouped under the heads of "dirt," "resins," "water," and "gutta."

The analyses were made after the method recommended by Obach,[a] in which the gutta and resins were separated from the dirt by means of chloroform, and these in turn separated from each other by hot alcohol, leaving the water to be determined by difference.

It is customary to consider under the head of "dirt" all foreign substances found, excepting resins and water. In most samples of commercial products this dirt is chiefly in the form of chopped-up bark, which adheres to the gutta-percha or rubber as it is taken from the trees and is never removed in the after treatment. Sometimes more bark is mixed in, or, better still, stones, pieces of bamboo filled with water, anything, in fact, which will increase the weight of the balls is dexterously added—on the inside. In the analyses no account is taken of these willful adulterations, but portions are selected which show an average amount of "dirt" gathered during the preparation of the sample by the natives. From 2 to 6 per cent of dirt is not only admissible, but generally unavoidable, and even when gutta-percha is cleaned for use on submarine cables by the usual methods from 1 to 2 per cent of this objectionable material always remains.

Under "resins" are considered resin-like bodies which properly belong in the gutta-percha; in other words, they, mixed with a substance known as "gutta," form the compound called "gutta-percha." These resins may vary greatly in appearance, from white crystals to sticky, yellowish oils, according to the species of tree from which they are derived. They are readily soluble in hot alcohol, and in this way are easily separated from the "gutta."

The best gutta known contains from 10 to 15 per cent of resinous bodies, and these are then generally considered to be not detrimental, as they are insoluble in water, become soft when heated, are good insulators, and while increasing the volume of the gutta-percha do not materially lessen its toughness. In fact the insulating material used for submarine cables at the present time is usually prepared with one part of resins to every two parts of gutta. Beyond that point the brittleness and other objectionable features become apparent and the gutta-percha is unfit for the best cables, and has to be mixed with a high grade in order to bring the percentage of gutta up to the required amount. Obach described a process used by the Siemen's Cable Company, of London, by which they extract a certain amount of resins from a low-grade gutta-percha, thus making it a high grade. The method is probably used in some form or other, but the details are kept secret.

The ratio of gutta to resins gives a fair idea of the value of a sample of gutta-percha, although other factors enter into consideration to a large extent. The above table shows that in Nos. 3, 4, 5, and 9 the ratio is practically identical, although some are commercially given a higher value than others. In reality the ratio of gutta to resin and the quality of the product contained should alone determine the value.

The resins which I isolated from the various samples were not analyzed, but put aside for future examination.

The percentage of "water" in commercial gutta-percha varies greatly. When the gutta-percha milk flows from the tree it contains a large proportion which, during coagulation of the gutta and resins, mechanically become inclosed by them in varying quantity and remains indefinitely unless dried out by heat. The Chinese in the Philippines, as well as many of the Moros, have learned from Singapore Chinese that by softening the gutta-percha in hot water and kneading it dough-fashion for some time at least 10 per cent of water can be added to its weight. As almost all of the water must be dried out of the gutta-percha before it can be used for cable insulation, this ingredient can only be considered as detrimental.

By "gutta" is meant the active principle, so to speak, of gutta-percha. It is that part by virtue of whose peculiar physical and chemical properties, gutta-percha softens readily under the influence of gentle heat, becomes plastic and easily molded, protects the copper wires of submarine cables for scores of years against the corrosive action of sea water, and insures almost complete insulation for the electric current. Obach and others who have written on the subject describe several kinds of "gutta," of many colors, and varying degrees of toughness, elasticity, electrical resistance, etc. The chemists of the submarine cable companies, who probably know the most on the subject, have written nothing, so it is still a question to decide if there are one or more so-called guttas. As a standard for comparison, at any rate, we are safe in taking the gutta obtained from the tree species, *Dichopsis gutta* (sample No. 1), because it has furnished the gutta necessary for most of the submarine cables already laid and has stood the test of years of service. The all-important question concerning Philippine gutta-percha is, then, What kind of gutta does it contain, the gutta serviceable for cable insulation, or an inferior kind? The only expert opinion on this matter which has come to my notice was that given by Mr. H. A. Reed, of the Bishop Gutta-Percha Company, New York, on samples of Philippine gutta-percha submitted to him through the United States Secretary of Agriculture, by the Philippine forestry bureau.

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[a] Gutta-percha and Rubber, by Dr. Eugene Obach.

He says, in reference to the gutta found in them, that the inferiority of the gutta-percha of this type is due not only to a large proportion of resins, but, even after being separated from the latter, it lacks the tensile and chemical properties of the genuine article. Thinking that my samples might be different from those submitted to him, or that perhaps his method of isolation of the gutta was such as to injure or change its original properties, I separated the pure gutta in considerable quantities from four representative samples by means of solvents and then dried them in a stream of carbon dioxide, to prevent change. When heated to the temperature of boiling water they all became quite plastic and easily admitted molding or cutting into any desired shape necessary for the following experiments:

Gutta.	Color.	Action toward—			
		Light: Refractive index 70° C.	Rotation in 0.5 per cent solution.	Heat: Softening temperature.	Stress: Tensile strength per square inch.
				° *C.*	*Pounds.*
No. 1	Light brown	1.5093	+6.75	62	5,262.4
No. 2	Cream white	1.5088	+6.5	60	6,668.15
No. 4	Yellowish white	1.5089	+7.5	61	5,134.7
No. 8	Cream white	1.5076	+4.75	56	Brittle.
No. 9	Very light chocolate	1.5093	+6.5	61	6,451.45

EXPLANATION OF TABLE.

The "color" of the guttas undoubtedly comes from the bark of the tree when cut to secure the gutta-percha, for, by repeated solution and precipitation, the color may be almost entirely eliminated, leaving the gutta only slightly tinted from a cream color to light pink and pure white when finely divided. The Singapore buyers, however, use a color test as a means of identifying the different classes of gutta-percha brought into the market, the pink and light-brown grades being considered superior to the white. The Chinese have also found that if a white gutta-percha is kneaded in hot water with some of the chopped-up red bark, it acquires a pinkish to brown appearance, which helps its sale materially, although of course adding nothing to the real value. It is my opinion that all variations of color are only incidental and not connected with the chemical structure of the gutta itself. The amount of color in the above samples was minimum and not sufficient to have any material effect on the physical properties. The other experiments with light, namely, those given under refractive index and rotation, are employed with great success in the commercial analysis of sugars, oils, fats, butters, etc. This is due to the fact that each chemical individual, provided it is capable of transmitting light, has an index of refraction peculiar to itself, which, for purposes of comparison, must be taken under constant conditions and, provided it is able to rotate the plane of polarized light, a degree of rotation which is also constant. While two chemical individuals may show identity in some one physical property, they can not continue this identity in two or more, so that more than one method was necessary to determine the relationship of the guttas examined by me. Substitution, adulteration, or variation in chemical structure can in this way be easily discovered and determined. Owing to certain mechanical and chemical difficulties encountered in making these determinations on the guttas, the limits of error of experimentation are outside of the differences found between Nos. 1, 2, 4, and 9, but do not include the marked differences displayed by No. 8. In determining the refractive index an Abbe-Zeiss refractometer was employed, a small amount of a concentrated solution of pure gutta in chloroform placed on each of the prisms and allowed to stand until the odor of chloroform had entirely disappeared. The prisms were then closed and kept at a temperature of 70° C. until the readings became constant, showing that all chloroform had evaporated. The above figures are the results of many determinations made with carefully prepared samples. The rotation was determined in chloroform, 0.5 per cent solutions being used because, when more concentrated, the absorption of light was too great to admit of accurate readings.

The physical tests given in the above table are so diversified as to bring out clearly the extent of resemblance or difference between the various samples of gutta submitted to them. The results show little variation between Nos. 1, 2, 4, and 9; indeed, these samples may be regarded as practically identical in composition. The physical constants appear to be those of a single chemical individual, the refractive index varies only in the third decimal place, the rotation is the same within the limits of only one degree, and the softening points carry only from 60° to 62°. The slight amount of color in those of the specimens, which it was impossible to remove, would be sufficient to account for even greater variations. No. 1, however, is the best sample used for a standard, and taken from Dichopsis gutta; Nos. 2, 4, and 9 are from the Philippine Islands. It would appear from this that gutta is a chemical individual, identical in all cases, and any substance, such as No. 8 for example, which varies from the properties recorded above, should not be designated as such. This opinion is, however, advanced subject to further confirmation by extended chemical investigation looking toward the determination of the chemical constitution of gutta. In the case of sample No. 8, the substance designated as gutta and the real gutta of No. 2 are very similar in appearance and chemical behavior. In tensile strength, however, they are widely divergent, and this difference is accentuated and not lessened by the other physical tests; for while these latter differences are not so marked, yet they clearly show that all the physical constants of No. 9 differ more or less from all the others, and hence this substance must certainly be different in chemical constitution. The wild Moros who chopped the tree down for me were certainly right in saying it was the most inferior of all.

By way of expert testimony, the samples of the various guttas were shown to Messrs. Hamilton and Winter, chief electrician and cable engineer, respectively, of the U. S. cable ship *Burnside*, who have had many years experience in testing and laying cables. They pronounced the guttas to be evidently of superior quality and worthy of thorough testing and exploitation, especially in view of the fact that thousands of miles of submarine cables must be laid between these islands, the best and only durable insulation for which is gutta-percha.

The action of heat in softening gutta-percha and making it plastic has previously been used as a test of value. It has been found that the best grades require more heat to soften them than the lower grades. According to the results obtained by me, the inferior grade of gutta (No. 8) also possesses the property of softening at a lower temperature than the superior gutta. The softening point was determined by molding a piece of gutta into the bottom of a glass tube sealed below, placing a sharp-pointed glass rod in contact with the surface and gradually heating in a bath of sulphuric acid until the point of the glass rod just began to enter the gutta.

The tensile strength, or toughness, possessed by gutta, next to its resistance to sea water, is undoubtedly its greatest merit commercially. Even the inferior grades of gutta-percha are used for objects requiring toughness combined with pliability and strength. In the insulation of a submarine cable great toughness is imperative, for during the laying of the cable it is constantly subjected to great strains from kinking, pulling, rubbing, etc., and when it has reached the ocean bottom, where the pressure is often 3½ tons to the square inch, it must not have sustained a fracture even as large as the diameter of a fine hair, for otherwise the moisture would slowly penetrate to the wires, the insulation would not be complete, and the cable would have to be pulled up and repaired.

In order that the measurements made might be within the limits of the instruments at hand, only small strands of gutta could be used for testing. To make these strands free from minute air bubbles was well nigh impossible, in consequence of which the breaking was in most cases brought about by weakness due to this source. The figures, while thus only approximate, are below and not above the true values and show clearly the enormous tensile strength of my samples. Obach gives a tensile strength of 5,000 pounds for the best gutta-percha, while for gutta he found about 6,500, which closely corresponds to results given above. This also brings out most clearly the excellent quality of the best Philippine guttas.

To make the necessary electrical tests which were to have been included in the above table, especially sensitive instruments are necessary, owing to the enormous insulating powers of gutta. The instruments belonging to the observatory, U. S. cable ship *Burnside*, and United States Signal Corps were most generously offered by those in charge, but upon inspection it was found that none were adapted to this special kind of work. An effort was also made to get the work done in Singapore, but without success. Samples will be sent to the United States at once, in order to have the necessary tests made.

II. RUBBER.

The only specimen analyzed was that secured from the natives of Tawi-Tawi, and is representative of the rubber exported from the southern islands. Chemically it is found to be composed as follows:

	Per cent.		Per cent.
Dirt	3.76	Resins	3.16
Rubber	81.57	Water (by difference)	11.51

No account was taken of the large pieces of bark in the center of the rolls, nor of the sea water mechanically inclosed during the coagulation of the rubber. This kind of rubber, secured from large vines, closely resembles the best grade of Borneo rubber, which also comes from the same source. In Singapore it ranks just under the best India rubber, which is acknowledged to be the best second-class rubber in the market. Whether these distinctions of class are due to intrinsic value of the rubber, or to the manner of coagulating and curing it, remains to be proven. This laboratory will take up the subject for investigation.

CONCLUSIONS.

The results of the chemical and physical tests of the gutta-percha and rubber show:

1. That the southern Philippines contain several varieties of trees producing gutta-percha of various grades of excellence.
2. That the Moro collectors have imitated their Borneo teachers in mixing gutta-percha from various species of trees into one mass, which is often further adulterated with bark, stones, and water before being sold to the Chinese for exportation.
3. That the best sample of gutta-percha so far found contains practically equal parts of gutta and resins, while that used for cable insulation calls for two parts of gutta to one part of resins.
4. That the "gutta" contained in the several species of trees is at least equal to that found in the best Singapore gutta-percha.
5. That the rubber is of high grade of its class and it is yet to be shown whether with proper coagulation and drying it will not equal the best commercial (Para) rubber.

THE PREPARATION OF BENZOYL-ACETYL PEROXIDE, AND ITS USE AS AN INTESTINAL ANTISEPTIC IN CHOLERA AND DYSENTERY.

In a paper recently published in the American Chemical Journal,[a] by Paul C. Freer and Frederick G. Novy, it was shown that the formation of organic peroxides by means of the oxygen of the air depended largely upon the surface upon which the organic materials were exposed, and in the course of the article referred to a means was discovered of preparing benzoyl-acetyl peroxide in any desired quantity and chemically pure.

Bacteriological investigation with the solutions of this peroxide in water have shown it to be intensely active as a germicide. One part of the hydrolized substance to 177 of water, and containing only 0.05 per cent of active oxygen, destroys all germs, including spores, almost instantly, and even at a dilution of 1:3,000 vegetating germs, as a rule, are killed within one minute, but the spores require an appreciable time. On comparing these results with similar ones with hydrogen peroxide, 1 :1,000, and phenol 5 per cent, it was shown that hydrogen peroxide, although it contained ten times as much active oxygen as the solution of benzoyl-acetyl peroxide, was by no means as effective, and the same may be said of phenol.

Experiments conducted in this laboratory demonstrated that solutions of benzoyl-acetyl peroxide as dilute as 1 part in 10,000 absolutely destroy the comma bacillus when it is placed in them in fairly large quantities on the loop of a platinum wire, and growth was inhibited, or at least extremely slow, when the dilution was 1 :30,000. Where a culture of beef bullion was directly mixed with equal parts of benzoyl-acetyl peroxide solution, 1 :1,000, the growth was prevented, but at greater dilution, where large masses of beef bullion were present, the results were not so satisfactory.

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[a] American Chemical Journal, vol. 27, 163.

Freer and Novy, at Ann Arbor, have demonstrated that large doses of benzoyl-acetyl peroxide, given in capsule form and amounting to as much as 1 gram a day for dogs weighing from 8 to 10 kilograms, were absolutely harmless, the dogs living in perfect health for from six to eight weeks, when the doses were discontinued. Mr. Charles L. Bliss demonstrated that all of the peroxide was excreted in the form of hyppuric acid. Post-mortem examination of the dogs showed only a slight fatty degeneration of the liver, which might be due to the benzoyl-acetyl peroxide, but which could also very properly be owing to the abnormal conditions under which the dogs were living. Certainly the doses were far in excess of those which would be given to human beings. It has, therefore, been demonstrated that benzoyl-acetyl peroxide can be successfully given internally without damage, and therefore, theoretically, it should be of the greatest value as an intestinal antiseptic.

CHEMICAL STRUCTURE OF BENZOYL-ACETYL PEROXIDE.

Chemically considered, benzoyl-acetyl peroxide may be regarded as hydrogen peroxide, in which one-half of the hydrogen has been substituted by the benzoyl group, and the other half by acetyl. It can, therefore, be considered as the benzoylester of aceto-peracid, or as the acetylester of benzo-peracid, and as such it is subject to hydrolysis, or saponification. Experiments carried on by Freer and Novy demonstrated that benzoyl-acetyl peroxide is in itself inert, and that its activity as an oxidizing substance and as a germicide only appears after it has been subjected to hydrolysis by means of water. When the substance is hydrolyzed, the reaction consists in the formation of aceto-peracid, which remains in solution, and dibenzoyl peroxide which is precipitated as a crystalline, insoluble powder, and which can be filtered from the clear solution. The germicidal effect of the solution, therefore, depends upon the presence of acetoperacid together with small quantities of benzoperacid.

In giving capsules of solid benzoyl-acetyl peroxide, this same hydrolysis will take place in the intestines and the resulting germicidal acetoperacid will have its local effect. Dibenzoyl peroxide has been proven to be practically inert, probably owing to the great difficulty with which it is hydrolyzed.

PREPARATION OF BENZOYL-ACETYL PEROXIDE.

An attempt having been made to obtain a shipment of benzoyl-acetyl peroxide in good condition from America and having resulted in a failure, it was clear that if any quantity of the peroxide was to be used in the Philippine Islands it would have to be made on the spot, and as a consequence a shipment of 10 kilos each of benzaldehyde and acetic anhydride was obtained from Germany.

Some fear was entertained as to the possibility of obtaining any yield of peroxide in a tropical climate, because of the continued high temperature, and consequently experiments in the preparation were at first conducted on a small scale. It soon became apparent that oxidation took place more rapidly at room temperatures common in Manila than it did in the United States, so that whereas complete reaction was accomplished in America in three or four days, the same result could be obtained here in forty-eight hours. The yield is, however, somewhat impaired, as a larger proportion of dibenzoyl peroxide appears to be produced in this climate than is the case in America, but nevertheless the results were sufficiently satisfactory to warrant the construction of a larger apparatus in which 3 kilos at a time could be worked up by means of a forced current of air.

After complete oxidation the crude product is placed in large tubulated containers, covered with petroleum ether and allowed to stand over night, by which means the larger portion goes into solution. The extracted peroxide and solvent are then tapped off at the bottom, fresh liquid added, and the operation repeated a second time. The united solutions are then carefully concentrated on a water bath (the temperature of which must not be above 80° C.) until about one-third has been distilled off, after which the containers are placed in the cold room of the ice plant. Crystals of benzoyl-acetyl peroxide contaminated with some dibenzoyl peroxide gradually separate and are eventually filtered and dried. During the first few weeks these were used without further recrystallization. Subsequently it was shown that the impurity of dibenzoyl peroxide was present in quantities sufficient to materially reduce the doses of benzoyl-acetyl peroxide, and consequently recrystallization from petroleum ether was resorted to in all the preparations used in the later work.

In all 2,750 grams of benzoyl-acetyl peroxide were obtained. The hospitals were at first supplied with double gelatine capsules containing 0.3 grams of benzoyl-acetyl peroxide each, but later it was found expedient to substitute a somewhat smaller dose of 0.25 grams, to be given more frequently, the best results being finally obtained by the use of the latter after coating with two layers of celloidin. At the same time solutions of 1:1000 benzoyl-acetyl peroxide were prepared and supplied in quantity as needed, the total amount used being 1,350 liters. These solutions can be kept without deterioration for several weeks. This work was in the charge of Dr. P. L. Sherman, who kept an adequate supply on hand at all times.

TREATMENT OF CHOLERA BY BENZOYL-ACETYL PEROXIDE AND RESULTS TO SEPTEMBER 1.

The patient, on arrival at the hospital, was immediately put to bed and hot-water bags were placed over the abdomen and at the extremities. In the beginning, benzoyl-acetyl peroxide was used only in solution of 1:1000, which was given by mouth as frequently as possible, and by high rectal injections every six hours, while stimulation, by means of 0.006 of strychnia and 15 c. c. of brandy hypodermically, was resorted to as often as demanded by the condition of the patient. If he was seen early in the disease and had considerable pain, while his general condition was good, 0.008 of morphine was given hypodermically, and if this did not relieve him the dose was repeated in twenty or thirty minutes. Turpentine stupes and hot-water bags were also used to relieve the pain. Vomiting was generally stopped by small doses of cocaine and by pieces of cracked ice.

The preliminary experiments, conducted in a small emergency hospital in the Farola district, proved sufficiently encouraging to cause a more extended use in the hospital which was soon established at San Lazaro, and in this place the administration of double capsules, containing each 0.25 grams of crystalline benzoyl-acetyl peroxide, was first resorted to. The treatment then divided itself into two methods:

First. The administration of benzoyl-acetyl peroxide in solution and in capsules as an intestinal antiseptic for the destruction of the bacilli, and

Second. The administration of stimulants to enable the patient to survive, if possible, the effect of the toxine already present.

It was found that the patients soon tired of the solution when given by mouth, and, if its administration was persisted in, it finally produced protracted vomiting in some cases. The administration of the solution per gram was therefore discontinued and it was eventually used by rectal injection only. The double capsules were always given on an empty stomach, one every four hours, as when given on a full one they were likely to produce vomiting. High rectal injections of 1:1000 solution were given every four hours during the acute stage of the disease, unless the patient was very weak. If the latter was the case and if he fought against the injection, it was not deemed safe to disturb him. The high rectal injections form a very important part of the treatment, especially in the second stage, where the bowel movements are approximately few, because the colon contains a large amount of toxine which is flushed out by this means. In a great many cases, where the patient was complaining of violent cramps in the abdomen, the injections seemed to give relief, so much so that a number begged for their administration. This relief was largely the result of mechanical action from the sudden dilation of the large intestine, but, as careful observation has shown in subsequent hospital experience, benzoyl-acetyl peroxide also has a stimulating effect.

The patients in this hospital were mostly natives and Chinese, and of the lowest type of the inhabitants living in the islands. They had a great dread of the detention camp, of disinfection, and of the destruction of their property; as a consequence, they made every effort to conceal the cases from the sanitary inspectors. Therefore, the greater number of the patients received during this stage of the epidemic had been sick during one to three days and were in a marked state of collapse. Furthermore, the natives and Chinese were unwilling to take medicine of any kind; in many cases great persistence on the part of the nurses was necessary before the capsules were taken, so that the excitement engendered was very deleterious. The road to the hospital was rough and the distance from many parts of the city considerable, therefore, the length of the trip was also a factor in the condition of the patients. These circumstances probably increased the mortality by at least 15 per cent. Of the 6 Americans admitted 4 recovered and only 2 died, both of the latter giving a history of being excessive users of alcoholic beverages. One was admitted after a recent debauch. The belief that the mortality among the natives was increased by the factors mentioned above is based upon the percentage of recoveries among the Americans in this hospital.

The results of the treatment in this hospital are shown in the following table:

San Lazaro Cholera Hospital.

[Schedule showing total cases treated from April 2, 1902, together with deaths and percentages from 1 year, 1 to 12 years, 12 to 21 years, 21 to 40 years, and over 40 years, at 3, 6, 9, 12, 18, and over 18 hours after admission.]

Ages.	Total cases.	Under 3 hours.		3 to 6 hours.		6 to 9 hours.		9 to 12 hours.		12 to 18 hours.		Over 18 hours.		Total per cent.
		Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	
Under 1 year......	1	....	....	1	100.00	....	....	....	....	....	....	....	....	100.00
1 to 12 years.......	20	1	5.00	2	10.00	1	5.00	3	15.00	....	....	6	30.00	65.00
12 to 21 years......	20	....	....	....	....	2	10.00	2	10.00	....	....	5	25.00	45.00
21 to 40 years......	54	10	18.52	5	9.26	3	5.55	4	7.41	6	11.11	14	25.93	77.78
Over 40 years......	25	2	8.00	6	24.00	4	16.00	2	8.00	....	....	5	20.00	76.00
Total........	120	13	10.83	14	11.66	10	8.34	11	9.17	6	5.00	30	25.00	70.00
		22.49				47.51								

Following the method in vogue in epidemics in India, the mortality percentage is calculated upon deaths taking place six hours and more after admission; those dying before the expiration of six hours, being in a moribund condition upon entering, are consequently not subjects for treatment. The mortality of patients dying after six hours in this hospital was 47.51; the total number of patients received being 120. Treatment with benzoyl-acetyl peroxide was used exclusively after the expiration of the first five days. The total mortality in this hospital, including all patients admitted, whether the deaths occurred over or under six hours, was 70 per cent, whereas at that time the total cholera mortality in the city was above 78 per cent.

The hospital, during the time in which benzoyl-acetyl peroxide was used, was in charge of Dr. James W. Jobling, to whose untiring efforts and continued attention much of the success was due, Dr. Jobling being ably assisted by Dr. T. K. Hunt.

In the first part of April it became evident that the San Lazaro Hospital was becoming infected, it being in tents, and in a more or less exposed locality, and the board of health decided to establish a new tent hospital at Santa Mesa. This was opened on April 12, and both the detention camp and hospital were finally placed in charge of Dr. Thomas R. Marshall, whose earnest work deserves the highest commendation. The records of treatment show that three methods were adopted:

First. Benzoyl-acetyl peroxide.

Second. Benzoyl-acetyl peroxide mixed with other remedies; and

Third. Remedies other than benzoyl-acetyl peroxide.

The results are as follows:

The number of patients treated in the Santa Mesa Cholera Hospital from April 12 until May 5, inclusive, was 186, of which 152 died and 34 were discharged cured. The condition of the patients was much the same as in San Lazaro, the long trip and duration of sickness before admission being deleterious. In this institution only a certain percentage of cases was treated with benzoyl-acetyl-peroxide solution and capsules, other measures being used with the balance, the three classes being kept separate. The doctors in charge reported irritation of the stomach as being produced by the capsules, which did not appear to be the case with the patients treated at San Lazaro.

"The introduction of the drug along the intestinal canal was the end desired. The administration of the powder by mouth in single capsules soon gave place to the use of double capsules, and this was maintained as routine treatment in doses from 0.20 to 0.32 gr. every two to four hours. Gastric irritation was a common symptom presented, and drugs directed to meet this indication were continually employed. It was observed very early that benzoyl-acetyl peroxide was best retained on an empty stomach, for when given on a full stomach retching and frequently vomiting occurred. This prevalency of periodic gastric intolerance to anything foreign greatly interferred with the proper and regular administration of the drug in this hospital." [a]

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[a] Report of Dr. T. R. Marshall.

This effect was subsequently avoided in Santiago Hospital (established on May 5), when the method of coating the capsules with two layers of celloidin was adopted. It is difficult to explain why the patients of the Santa Mesa Hospital only suffered from marked gastric irritation after taking the drug. Perhaps the cause of this is to be found in the fact that the benzoyl-acetyl peroxide was delivered at a great distance from the laboratories, and therefore probably melted in the capsules, after which the action of the air and the heat of the sun facilitated hydrolysis, which, once inaugurated, would continue rapidly if the hyperoxide was kept in contact with the moisture and imperfectly cooled. The absorption of water through the coating of the capsules and the consequent hydrolysis would produce acetoperacid, which is irritating, and the effects of which would become apparent in the stomach. Coating with celloidin and preserving in pasteboard boxes covered with oiled paper avoids this difficulty. Despite these obstacles, the statistics of this hospital demonstrate that the best results were obtained with the benzoyl-actyl-peroxide treatment. This becomes apparent by the study of the following table:

	Per cent.
Total number of cases	186
Total death rate	81.7
Total death rate of patients living over six hours	48.9
Total death rate of patients living under six hours	28.4
Died before arriving	4.3

Of these patients, 93 received benzoyl-acetyl-peroxide treatment, either by rectal injections, by capsule, or both, together with cardiac stimulants, hot applications, enemas of normal salt solution or saline transfusion, 29 received other treatments, and 17 a mixed treatment, using benzoyl-acetyl peroxide only as enemas, 8 no treatment at all, and of 39 there is no record. Of the 93 cases treated with benzoyl-acetyl peroxide, 26 recovered; of those who received benzoyl-acetyl peroxide mixed with other remedies, 7 recovered; and of the 29 patients not receiving benzoyl-acetyl peroxide, none recovered. The benzoyl-acetyl-peroxide treatment, therefore, has a total death rate of 72 per cent, as against a death rate of 100 per cent for treatments which contained no benzoyl-acetyl peroxide. The fact must be taken into consideration, however, in this connection, that a number of the cases not receiving benzoyl-acetyl-peroxide treatment were practically moribund at the time of admission, so that the death rate of 41.1 is recorded for these patients under six hours. The above comparison does not of necessity represent the germicidal value of the drug, because stimulation, heat, diet, nursing, etc., have no credit in the statistics for the good they probably rendered, but some conclusions can be drawn from the death rate of those patients receiving no benzoyl-acetyl peroxide.

The treatment resorted to in this hospital consisted, quoting from the report of Dr. Marshall, "in giving 1:1000 solution by mouth and rectal injection. By mouth it was soon discontinued, due to gastric intolerance; but by rectal injections beneficial results were evident. This was soon increased in efficiency by the addition of normal salt solution to an equal quantity of 1:1000 solution of benzoyl-acetyl peroxide, which finally became a routine treatment. Of the treatments where the benzoyl-acetyl peroxide was used it was not the only factor, the patient being given enemas, strychnine, hot applications, and whisky or brandy, in some cases small doses of caffein being used."

The records of the first few days of this hospital were unfortunately not complete, so that absolutely definite conclusions as to the value of the various treatments can not be reached from this report only.

The hospital at Santa Mesa, being in a situation far removed from the city, was finally abandoned, and on May 5 the board of health secured ample quarters in the Santiago Hospital, where facilities for treating patients were much superior to those which were previously available, and where a systematic comparative treatment could be inaugurated. The Santiago Hospital was in the able hands of Dr. E. A. Southall during the first month; subsequently, after his illness, Dr. Lindley took charge. Both gentlemen worked with the greatest zeal, and developed a number of new features of treatment.[a] In this they were assisted by Dr. Jobling, who acted as bacteriologist. As a result of experience they finally developed the following practice: When a patient was not in a moribund condition as a result of the violent toxæmia produced by cholera, but was in the second stage or state of collapse, it became the practice among the attending physicians to resort to subcutaneous injections of normal salt solution, ½ liter combined with a like amount of benzoyl-acetyl peroxide solution of 1:1,000. The point selected for the injection was usually the breast. It was observed that the stimulating effect of the normal salt solution combined with the benzoyl-acetyl peroxide was more direct and lasting than that of the normal salt alone, the combination acting as a decided stimulant upon the circulatory system, and increasing the volume and force of the blood current. The drug appeared to act as a stimulant upon the respiratory system and no marked effects were noted upon the nervous system.

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[a] The results and statistics from the Santiago Hospital are taken from reports by Drs. Southall and Lindley. Dr. Southall covered the period up to June 17, and Dr. Lindley the remainder, including the statistics.

Capsules, double coated with celloidin and containing each 2½ grains of benzoyl-acetyl peroxide were found to pass through the small intestine undissolved and were in some instances recovered from the feces, having lost about 2 grains of the drug during their passage, and thus, by osmosis, the hyperoxide was gradually distributed along the length of the intestinal canal. High rectal enemas of benzoyl-acetyl peroxide, 1:2,000, were given in a large proportion of the cases and no ill effects were noted from this method of administration excepting a nervous excitement incident to the passage of the tube, in a few cases.

In 2½ per cent of the cases of cholera treated in this hosptial evidence of intestinal hemorrhages were seen at the time of admission, the blood passed being usually slight in amount, and it was not observed that the benzoyl-acetyl peroxide in any way influenced the amount or gross appearance of the hemorrhagic stools, save by the possible action of flushing out the large bowel and rectum. This lavage of the large bowel was in many instances followed by decided relief from pain and a diminution of restlessness and semidelirium, this having also been observed in the previous hospital at San Lazaro.

The use of alcohol as a stimulant was discontinued in many instances in this hospital as the mental, physical, and emotional excitement was followed by a grave reaction. A careful administration of strychnine was prescribed in most cases of collapse, accompanied by the use of hot-water bags, hot-water bottles, etc., atropine being used to give relief in cases of sudden collapse. Alcoholic baths were administered, where indicated, and enemas of benzoyl-acetyl peroxide mixed with normal salt at 44° to 45° C. were also employed. Alcoholic stimulants in the form of sherry and malaga wine were only resorted to at the time of convalescence.

The only other treatment used by American physicians, as the table will show, which can come into consideration in addition to benzoyl-acetyl peroxide alone is the one with guiacol carbonate and calomel mixed with the peroxide. The guiacol carbonate and calomel is administered in doses of $\frac{1}{10}$ grain of calomel to 3 grains of guiacol carbonate in powder every four to six hours, and it markedly lessened the bowel movements. The drug had very little effect upon the circulatory, respiratory, and nervous systems, with the exception, perhaps, of a slight reduction of temperature in some instances. A much larger percentage of cases treated by other methods died, so that the American physicians in attendance finally decided in favor of using benzoyl-acetyl peroxide. The treatment with this substance, as outlined above, is now exclusively used with American patients, but the native physicians, who have been in charge of the Filipino wards for the past few weeks, have not, as yet, attempted to use it, but have confined themselves to other methods.

The guiacol carbonate and calomel treatment alone was used up to the date of writing in 54 cases, and shows a percentage of recoveries of 14.18; against this, benzoyl-acetyl peroxide, mixed with guiacol carbonate and calomel had a total recovery of 41.94 per cent and benzoyl-acetyl peroxide alone of 40.42 per cent. These tables would show a slight advantage in favor of the mixed treatment, but the death rate for the latter, under six hours, of only 4.49 per cent, as against 16.31 per cent for benzoyl-acetyl peroxide goes to show that in the later stages of the epidemic, when many less severe cases were encountered, the mixed treatment had the advantage, because the patients were in a better condition on entering the hospital. This will be understood when it is remembered that the treatment with benzoyl-acetyl peroxide was inaugurated at the beginning, when the most adverse conditions as to mortality were encountered. The average death rate in the city during June was 86.2 per cent. The mixed treatment was only tried later, when the death rate had sunk to 70 per cent, and would thus gain an advantage in the condition in which the patients reached the hospital. If this circumstance is considered, it is evident that benzoyl-acetyl peroxide alone is at least of the same value as the peroxide mixed with guiacol carbonate and calomel, although the latter apparently does little harm. In this connection it is worthy of note, however, that the percentage of deaths over six hours is only 43.25 for benzoyl-acetyl peroxide as against 53.55 for the mixed treatment. When we consider that patients who die under six hours can scarcely be regarded as having received treatment at all, it is evident that the advantage lies with benzoyl-acetyl peroxide alone. The majority of the patients in this hospital were not treated by either of the above methods. Four hundred and eight cases were treated with either benzoyl-acetyl peroxide or benzoyl-acetyl peroxide mixed with guiacol carbonate and calomel, and of these 169 recovered; 593 received other treatment, and of these 106 only, recovered.

The following gives a summary of results:

Total cases received	1,031
Cases in hospital	30
Reported upon	1,001

	Benzoyl-acetyl peroxide treatment.		Benzoyl-acetyl peroxide mixed with guiacol carbonate and calomel.		Guiacol carbonate and calomel treatment.	
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
Total cases treated	141		267		54	
Deaths under 6 hours	23	16.31	12	4.49	16	29.62
Deaths over 6 hours	61	43.25	143	53.55	30	55.55
Recoveries	57	40.42	112	41.94	8	14.81

SUMMARY.

	Number.	Per cent.
Total cases treated	1,001	
Deaths	696	69.53
Recoveries	305	30.46

On July 21 certain wards were turned over to native physicians and nurses, who inaugurated treatments which had proven efficacious in the previous cholera epidemic in Manila. These methods have varied considerably from time to time, and, as individual physicians adopted different remedies, details as to the exact measures employed in a given series can not be given. The treatment practically divided itself into two heads: one with saline enemas three times a day and administration of calomel 3 centigrams, tannalbin and bismuth 25 milligrams every three hours; and the second class with tannic acid enemas 1:100, calomel and benzonaphthol every three hours. As stimulants, hypodermic injections of strychnine, sodium benzoate, caffein citrate, and subcutaneous injections of sodium benzoate and caffein citrate combined with one-third normal salt solution were used. The following tables, covering the period between July 21 and September 1, are appended:

	Cases treated by—			
	American physicians.		Native physicians.	
	Number.	Per cent.	Number.	Per cent.
Total cases treated	138		136	
Deaths under 6 hours	17	12.31	31	22.80
Deaths over 6 hours	60	43.48	56	41.19
Recoveries	61	44.20	49	36.02

As will be seen from the above, the native physicians have a very favorable percentage of recoveries, but the total is nevertheless 8.18 per cent of all cases less than that to be ascribed to methods using benzoyl-acetyl peroxide.

Five hundred and three cases are not recorded in any of the above treatments. These can not be classified, as the means employed and remedies administered varied with individual physicians and at different times, many of these cases representing the class of patients who where brought into the hospital in a moribund condition and who received no treatment at all. None of them received benzoyl-acetyl peroxide. The percentage of recoveries with this remainder was 14.3. The total percentage of recoveries for the entire hospital was 30.46.

BENZOYL-ACETYL PEROXIDE IN AMEBIC DYSENTERY.

Benzoyl-acetyl peroxide has given very satisfactory results in amebic dysentery. In the treatment of this disease one should recall that not one but two factors are concerned in the etiology of the malady, and particularly in its progress. These factors are the amebæ and the intestinal bacteria, both of which must be attacked. In the following, Dr. R. P. Strong, of the biological laboratory, reports the results obtained with 11 cases:

"It has been demonstrated in the biological laboratory, by experimental studies on cats, that the bacteria in the intestine, always present, and other varieties of microorganisms occasionally present, may play an important part in the extension of the lesions in amebic dysentery, and that it is particularly to their influence that the necroses found in the intestine in this disease are due. Bacteria are always plentiful in the sections from experimental dysenteric cases, and in very large numbers in the necrotic areas. The same is true in sections of the intestine in human dysenteric cases. While it seems probable that the amebæ proceed in advance of the bacteria, and make openings for them in the mucosa, the latter, however, closely follow them, modify the lesions, and cause increased tissue destruction. Particularly is this true when the pyogenic cocci are present in large numbers, and, indeed, the immediate cause of death in the disease may be due to these microorganisms.

"Quinine used in enemeta has hitherto usually given the best results in the treatment of amebic dysentery. The advantages of benzoyl-acetyl peroxide over quinine, however, are apparent, for the latter, while quite capable of killing amebæ, even in dilute solutions, also attacks the bacteria which are present in the intestines, and it has been found possible by its use to greatly reduce the number of microorganisms in the stools.

"Benzoyl-acetyl peroxide is therefore now used for the routine treatment of this disease in the following manner:

"The patients take daily, or in some cases oftener, a 1:1000 solution of the drug in enemeta, from 1 to 2 quarts being slowly injected through a long rectal tube, which is introduced its entire length. The hips of the patient are elevated during the operation. In addition to this treatment, 5 grains of the drug, inclosed in a celloidin capsule, are administered three times daily. Such treatment has been continued in a number of cases for over two months, with decided benefit and with no unfavorable results.

"In addition, a number of patients have been given a 1:1000 solution of benzoyl-acetyl peroxide to drink ad libitum, and in fact some of these have taken no other liquid for several weeks.

"The other treatment has consisted in the use of occasional purgatives, such as calomel or Rochelle salt; and for symptoms requiring it, some form of opium has occasionally been employed, usually in the form of Dover's powder.

"So far, the results have been very encouraging. There have been 11 cases treated. Two of these have died, one from a complication of a liver abscess. The remaining nine are at present doing well and are without any symptoms of the disease. The opportunity for the trial of this drug in cases of acute infectious bacillary dysentery has not as yet presented itself, as no epidemic of this disease has occurred in the city this year. It is probable that benzoyl-acetyl peroxide will be of particular value in the treatment of this variety of dysentery."

THE BIOLOGICAL LABORATORY.

Continued experience of colonial governments in the Tropics, extending over a large number of years, has demonstrated that the people of these regions are especially prone to devastating epidemics of infectious and contagious diseases. So long as the suggestion of prophylactic treatment is solely in the hands of isolated physicians in the various communities, concerted action and satisfactory results can not be obtained, and for this reason all of the interested governments have from time to time established laboratories for the study of tropical diseases, or have even at great expense equipped expeditions to travel to the seat of the disease, there to make studies and report to the home government. The result has been, as was pointed out in the discussion of the needs of the chemical laboratory, in many cases a duplication of institutions within the limits of the same colony, and an obviously inevitable loss of time and efficiency. The Philippine Islands are as prone to epidemics as other tropical countries. We have, within the brief existence of the present government laboratories, been in contact with bubonic plague, cholera, rinderpest, surra, amebic dysentery, and other diseases peculiar to the Tropics, and it is gratifying to note that the board of health, physicians, and other parties interested, have, with increasing reliance on the results obtained, applied to the government biological laboratory for relief and assistance.

The laboratory has been organized on the sound principle of the establishment of a central institution under one director, and although up to the present time the apparatus and supplies have been unsatisfactory and the scientific corps inadequate, it has been able in large part to meet the demands that have been made upon it. The value of laboratory work in tropical diseases is of course no longer doubted by anyone, and the advantage to a government, from a financial standpoint alone, provided the laboratories show ways and means of combating epidemics, is inestimable.

In classes of diseases which are of importance not only to the individual infected, but also to the general public health and upon the early and definite diagnosis of which the safety of the community depends in so large a degree, the laboratory must be consulted for a final decision. Examples of such diseases are bubonic plague and Asiatic cholera. The latter before the appearance of an epidemic may be clinically impossible to differentiate from cholera nostras of a severe type; but the laboratory renders the distinction possible and by an early diagnosis enables the authorities to inaugurate vigorous measures. In bubonic plague it is often possible to diagnose the case some time before clinical symptoms have definitely shaped themselves, and early diagnosis is of course an important factor in the suppression of the disease.

In animal maladies, such as surra, glanders, and farcy, the correct and accurate diagnosis may save many individuals which otherwise might be destroyed, and investigations may lead to prophylactic treatment which will save the lives of many more. In rinderpest such methods have already been discovered in the production of a prophylactic serum, and work in this direction, if it enables importers once more with impunity to bring their cattle into the Philippine Islands, will be of such value as to render nominal the cost of equipment and the assistants necessary in its production in comparison with the benefits conferred. When the Serum Institute is thoroughly organized a portion of the expense will be covered in by small charges made for the sale of its product.

The necessity of the biological laboratory has been conclusively shown by these few instances, which could be multiplied almost ad libitum by considering other tropical diseases. It is, however, certain that the mere establishment of a biological laboratory is not sufficient. It must be thoroughly equipped with modern appliances and must have at its command a sufficient force of scientifically trained men to carry on its routine work, to conduct investigations, and to meet any emergency which may arise. Insufficient apparatus, cramped and inadequate quarters, assistants who have to be continually changed from one line of work to another, result in such a loss of time as to seriously cripple the efficiency of the laboratory.

The present equipment, quarters, and staff is entirely inadequate to meet the growing demands, and many important lines of work must be deferred until the completion of the new building.

The needs of the laboratory in regard to a reference library have been mentioned in another portion of the report, and it is only necessary to emphasize again that a working library needs not only the current journals, but also complete sets of those publications from the beginning. The man who is precluded from reading the literature of any subject in which he is engaged may thereby sacrifice many hours of valuable time by repeating work which has already been done. Manuals and textbooks are but compilations which can give only a brief review of the field and can not give that rigid and definite knowledge which alone is the basis for scientific work.

WORK OF THE BIOLOGICAL LABORATORY.

The following report on the work of the biological laboratory is submitted by Dr. R. P. Strong, director of the biological laboratory:

CLINICAL LABORATORY WORK FOR GOVERNMENT INSTITUTIONS.

All the clinical laboratory examinations have been performed for the Civil Hospital, the San Lazaro Hospital, Bilibid Prison, and various cholera hospitals. The following table will give some idea of the number and character of the examinations made:

Clinical laboratory examinations, September, 1901, to August, 1902.

[P=Examinations showing organisms. (Positive.) N=Examinations showing absence of organisms. (Negative.) T=totals.]

	Civil hospital.			Bilibid prison.			San Lazaro Hospital.			Cholera hospitals.			City veterinarian.			Miscellaneous.			Totals.		
	P.	N.	T.	P.	N.	T.	P.	N.	T.	P.	N.	T.	P.	N.	T.	P.	N.	T.	P.	N.	T.
Sputa	19	87	106	20	78	98										76	81	157	115	246	361
Urines			110			3												60			173
Fresh blood specimens for malarial hematozoa	21	211	232													2	19	21	23	230	253
Serum reaction for typhoid fever	3	52	55	0	2	2										4	13	17	7	67	74
Blood counts			111															4			115
Gonococci	6	10	16				437	685	1,122							4	0	4	447	695	1,142
Feces			508			123						946						49			1,626
Ameba dysenteriæ	94			27												9			130	520	650
Ameba coli	4			2												0			6	644	650
Monads	63			2												3			68	582	650
Strongyloides intestinalis	12			0												0			12	638	650
Ova of trichocephalus dispar	18			6												1			25	625	650
Ova of uricinaria duodenale	9			2												0			11	639	650
Ova of ascaris lumbricoides	1			1												0			2	648	650
Tænia	1			0												1			2	648	650
Spirilla of Asiatic cholera	4			1						805						5			815	161	976
Lymphangitis epizootica													14	1	15					15	
Glanders													2	1	3					3	
Surra													42	6	48					48	
Hog cholera													5	1	6					6	
Total			1,138			226			1,122			946			72			312			3,816

WORK RELATIVE TO BUBONIC PLAGUE.

In the autumn of the year 1901 an effort was made on the part of the board of health of Manila to exterminate the rats in the city, particularly because they were suspected of playing an important rôle in the dissemination of bubonic plague, and indeed, especially, because from the organs of the dead bodies of several of these animals the bacillus pestis had been isolated here. The rats were collected and sent to the biological laboratory. In all, 47,635 were examined for this organism. The bacterium of pest was found in the organs of these animals in 166 cases, or in 0.34 per cent. Taking a total average, the highest percentage at any one time was 2.3 per cent. The percentage of infection gradually diminished, and reached naught on January 31. During the time in which the highest percentage of infected plague rats was encountered a large number of these animals were found dead in the plague districts. In almost every instance in which a rat was found infected with the bacillus pestis it was later ascertained that it had been found dead or captured in a house where cases of human plague had occurred. The location of plague-infected rats was the basis for action by the board of health in improving and altering houses.

At first merely cover-glass preparations were made from the spleen, liver, and heart's blood of the rats, and if bacilli of suspicious morphology were encountered, cultures were then taken from these organs and animal inoculations made if necessary. Such a method did not, however, seem entirely satisfactory, and later on an effort was therefore made to perfect this technique, and to prepare cultures in as many cases as possible. The work was a very tedious one, and particularly so because other bacilli somewhat resembling those of bubonic plague have been found here in these animals.[a]

This work was carried out under the direct supervision of Dr. J. W. Jobling, assistant bacteriologist, who deserves great praise for the conscientious manner in which he conducted it. During the last few weeks of the examinations no rat was found infected with plague bacilli, and the work was discontinued on the appearance of Asiatic cholera in Manila. No further comment is necessary on the value of these examinations, which is apparent from the results obtained.

PREPARATION OF PLAGUE VACCINE.

As the serum institute had not yet been established and as the board of health early in the year desired to vaccinate the native and Chinese population of Manila against bubonic plague, it became necessary to prepare the virus for this disease in the biological laboratory. The method of vaccination used was that described and pursued by Shiga, and which consists briefly of the subcutaneous inoculation of a definite amount of plague bacilli of known virulence which have previously been killed by heating for one hour at 60° C. while suspended in normal salt solution to which 0.5 per cent carbolic acid had been added. The method will not be described in detail, as the preparation of vaccines belongs more to the work of the serum institute.

In all, 19,716 doses of plague serum were prepared and delivered to the board of health.

ASIATIC CHOLERA.

The following report to the commissioner of public health cites the appearance of the first cases of Asiatic cholera in Manila:

MANILA, P. I., *March 22, 1902.*

The COMMISSIONER OF PUBLIC HEALTH, *Manila, P. I.*

SIR: I have the honor to inform you as follows in regard to the recent examination of cases of suspected cholera:

During the evening of March 20 I was notified that there were two cases of suspected cholera lying in the San Juan de Dios Hospital. On investigation these two cases proved to be male Filipinos, one about 45 and the other 24 years of age.

It was ascertained that the former had been taken sick early in the morning of March 20, with violent purging and cramps in the abdomen. He had been removed to the hospital, where early in the day the severe diarrhea had continued, and he had complained of cramps in his legs. On examining the patient at 9 p. m., March 20, he was found to be in a state of extreme collapse. The skin was cold and bathed with perspiration. The rectal temperature registered 102°. No pulse could be felt at the wrist, and the heart sounds were very rapid and feeble. He was already unconscious. An examination of the rectum showed no discharge, and it was stated that there had been no bowel movement for about six hours. A cover-glass preparation was, however, made from the rectal mucosa and examined microscopically. While a few organisms present possibly resembled morphologically the spirillum of Koch, the majority did not suggest this organism.

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[a] See also Edington, British Medical Journal, II, 1901, p. 287.

An examination of the other patient (Case II) showed a somewhat similar condition to the first. He was still, however, conscious, and stated that he had been attacked with severe diarrhea, cramps, and vomiting the previous night (March 19). There had been no diarrhea since morning. He complained of great thirst and the voice was very husky. The skin was cold to the touch, and no pulse was perceptible at the wrist. An examination of the chest showed rapid, feeble heart sounds. The abdomen was retracted.

These cases were regarded as very suspicious ones from a clinical standpoint, but as attacks of cholera nostras have occasionally been observed before in Manila, a bacteriological examination was most desirable. As there was also no discharge from the bowels in this case, and no soiled linen among the bed clothes, an attempt was made to secure a rectal speculum, or rectal tube, in order that satisfactory material for a microscopical examination might be secured.

At this time, while a search was being made in the hospital for these instruments, a telephone message was received, stating that a native had just died under suspicious circumstances in one of the districts near by, and that the body was then on the way to the morgue. The further examination of Case II was, therefore, deferred in order that an autopsy might be performed on Case III as soon as possible.

Case III.—The necropsy on this case took place about an hour after death. The body was still warm, but rigor mortis was already marked. The following is a brief summary of the more important changes found present:

The intercostal muscles were dry and red in color. The right chambers of the heart were distended with dark, clotted blood. The bases of the lungs were congested. Upon opening the abdominal cavity, the serosa of the ileum and jejunum presented a rose-pink color. The small intestine was dilated, but the large bowel was contracted and pale grayish in appearance. The blood vessels of the small intestine were markedly injected. On opening the ileum a large amount of watery fluid containing whitish flakes escaped. The solitary follicles were swollen and reddened, particularly at their margins. There were many small diffuse hemorrhages in the mucosa. This process continued nearly through the jejunum. The mucosa of the large intestine was in general pale gray in appearance, but its vessels were injected and numerous small hemorrhages were present. The spleen was small and firm. The capsules of the kidneys stripped easily. The kidneys were much congested and their surface vessels deeply injected. The stomach was distended with gas and contained a small amount of fluid. Its mucosa showed a few small superficial hemorrhages. The liver showed moderate cloudy swelling. The mesenteric glands were not particularly swollen. Cover glass preparations were made from the mucosa of the ileum and from the spleen. Those from the latter were negative for organisms. The former showed a number of comma-shaped bacteria, but there were also a large number of other organisms present. Cultures were made from the spleen and from the small intestine in Dunham's solution.

Shortly after midnight and just before the completion of the above autopsy, a second case was brought to the morgue.

Case IV.—This body was also examined. Moderate rigor mortis was present. The abdominal cavity was free from fluid. The spleen was small and firm. The liver showed cloudy swelling. There was moderate atheroma of the arch of the aorta and congestion of the lower lobe of the left lung. The vessels of the mesentery and of the small intestine were deeply injected. The mucosa of the latter showed numerous diffuse bright red hemorrhages, but the swelling of the solitary follicles was not so marked as in Case III. The mucosa of the large intestine also showed numerous hemorrhages, but was elsewhere in general pale in color. Cultures were also made from the intestines of this case.

On arriving at the laboratory, plate cultures were made from the Dunham's tubes inoculated with material from the small intestine of Cases III and IV. At 9 a. m. of the same day an examination of the culture tubes inoculated from the spleen showed no growth. In those from the small intestines of Cases III and IV there was a distinct cloudiness of the media. Hanging drop preparations made from the top of the media showed a motile bacterium often curved in shape and occasionally appearing in S-shaped forms. Stained preparations showed a comma-shaped organism measuring about 4 μ in length by 0.4 μ to 0.5 μ in thickness. Preparations made from the colonies which had developed on the plates inoculated with intestinal material showed the spirillum to possess but a single terminal flagellum. Several large loops from the plate colonies were suspended in 1 c. c. of salt solution and injected into the abdominal cavity of a guinea pig. The same amount was injected into the breast muscles of a pigeon.

Cultures in glucose agar and Dunham's solution were prepared from colonies on the plate cultures, and in the latter media also from the upper portion of the original tubes of peptone solution inoculated from the intestine at necropsy. On Friday afternoon the Dunham's tubes all showed a marked indol reaction on the addition of specially prepared nitrite-free sulphuric acid, while the glucose-agar tubes showed no gas production.

It was, therefore, reported verbally to the board of health that probably the spirillum of Asiatic cholera had been isolated.

On Saturday morning the guinea pig was found dead. During the afternoon before, its temperature had been subnormal. On autopsy there was a large amount of cloudy serous fluid in the abdominal cavity. A hanging drop preparation showed very large numbers of comma and spiral shaped bacteria, all clumping in the serous exudate. The pigeon was still alive and has since remained well.

Case I died on Friday morning, and the autopsy showed in general a somewhat similar condition to that observed in Cases III and IV. The large intestine, however, showed more numerous and extensive hemorrhages. There was a large amount of rice-water material in the small intestine. Cover slip preparations from a floccule of mucus in the ileum showed almost a pure culture of coma and spiral-shaped organisms. Cultures in this case have revealed an organism similar to that isolated from Cases III and IV.

Case II is still alive and apparently recovering.

I therefore have the honor to inform you that cases of Asiatic cholera have occurred in Manila, and that the spirillum of Koch has been isolated and obtained in pure culture from these cases.

Very respectfully,

RICHARD P. STRONG,
Director of the Biological Laboratory.

Notwithstanding the occurrence of a considerable number of cases shortly after this report, the presence of Asiatic cholera in Manila was still doubted by many. In fact, it was apparently generally doubted by the native population, and several of the native physicians informed us that this disease "came every year before the rains and was not true cholera." For the purpose of the study of the disease, and in addition, to convince these people, particularly the physicians, that the deaths were really from Asiatic cholera, autopsies were held on all the dead brought to the morgue. On April 2 the following letter was received from the commissioner of public health:

MANILA, P. I., *April 2, 1902.*

Lieut. RICHARD P. STRONG,
Director of the Biological Laboratory, Manila, P. I.

SIR: I have the honor to request that you furnish me with a report of cases of cholera examined from the beginning of the epidemic to March 31, with statement as to what you have found and whether the disease is actually Asiatic cholera or not. A brief report from you on this subject is necessary for the reason that a large number of the people in the city of Manila, among whom are some physicians, including several Americans, do not believe that Asiatic cholera exists at present in the city of Manila, and are disquieting the people to a certain extent for this reason.

Very respectfully,

L. M. MAUS,
Commissioner of Public Health.

To this communication the following reply was sent:

BIOLOGICAL LABORATORY,
Manila, P. I., April 2, 1902.

The COMMISSIONER OF PUBLIC HEALTH, *Manila, P. I.*

SIR: In reply to your communication of April 2, I have the honor to inform you that since the outbreak of Asiatic cholera in the city of Manila on March 20, 1902, autopsies have been performed on all bodies brought to the cholera morgue. In 84 of these cases, the pathological-anatomical lesions of Asiatic cholera have been found present. Pure cultures of the spirillum of Asiatic cholera isolated from them, as well as the anatomical material collected from them, may be seen by physicians at the government biological laboratory.

Very respectfully,

R. P. STRONG,
Director Biological Laboratory.

Careful records were kept of the first 200 necropsies. Later, when the deaths became so frequent, this was no longer practicable with the quantity of other work there was to be carried on, and autopsies were performed merely for a definite diagnosis of cases, and were omitted in a number of those from the hospitals in which the diagnoses were conclusive during life. Over 1,000 necropsies have been performed.

CLINICAL LABORATORY DIAGNOSES OF CASES OF CHOLERA.

Owing to the quarantine regulations and restrictions placed by the board of health upon those afflicted with cholera and upon the houses in which cases of cholera had occurred, it became necessary to have early, definite, and indisputable diagnoses made and the laboratory performed this work. Various methods of procedure were tried. Agglutinative tests with the serum of those infected and the spirilla of Koch often gave doubtful and negative results, and it was found impossible to rely upon this test for the final diagnosis of cases even well marked from a clinical standpoint. Experiments for agglutination made with the admixture of serum from cholera cases and normal human serum also failed to give satisfactory data for diagnosis. For routine work, however, the bacteriological examination of the stools by cultural methods gave the surest and most conclusive results, although in many cases mere cover slip preparations from them showed almost pure cultures of cholera spirilla. For the cultural method several oeses of the suspected stool were placed in a test tube of Dunham's solution and thoroughly mixed. After from eight to ten hours two or more tubes of Dunham's solution were inoculated with two oeses each, made from the surface of the original tube of this medium. At the same time a hanging drop and cover-slip preparation were made from the surface growth of this tube. If spirilla of similar morphology to Asiatic cholera were found to be abundant, no further cultures were made from it; but if there were few spirilla, or their form was doubtful, then plate cultures were also prepared from the surface growth in the original tube. After the two tubes of Dunham's solution inoculated from the surface of the original tube had been placed in the incubator for from eight to twelve hours they were removed and a few drops of specially prepared nitrite-free sulphuric acid were added to one of them. If the so-called "cholera-red" reaction appeared and the morphology of the organisms in the parallel tube was correct, a bacteriological diagnosis of cholera was made. If there was no nitroso-indol reaction, the colonies on the original plate cultures were worked over, or if these had not been made, they were prepared from the surface of the parallel tube to which sulphuric acid had not been added. If from all of these no spirilla were obtained, a negative bacteriological diagnosis of cholera was made. For routine work during an epidemic of cholera this method seems satisfactory. However, in almost all cases in which the cholera spirilla are present in the original stool the nitroso-indol reaction is obtained in the second Dunham's tube, though it is necessary that the proper peptone should be used in preparing this medium. Of the varieties used, Grubler's has given us by far the most satisfactory results. De Witte's often gave but a feeble reaction, and Merck's, Bausch & Lomb's, and Nishyama's practically proved to be of no value in obtaining this reaction for diagnostic purposes. The task of isolating cholera spirilla either from the intestinal tract or from stools usually proved an easy one, and particularly did it seem so by comparison with the careful search we have often found it necessary to make for bacillus dysenteriæ in the intestines or stools of those suffering from epidemic bacillary dysentery.

While during an epidemic the clinical diagnosis in many cases of Asiatic cholera is as definite as it can be in any disease, and a bacteriological diagnosis is almost superfluous; and while a diagnosis in some cases can scarcely be made during the life of the patient (for, as Andral has aptly remarked of the malignant form, "It begins where other diseases end—in death"), nevertheless, in a large number of other cases the diagnosis is not only difficult but impossible without the bacteriological isolation of the spirilla; and we have all seen many instances during this epidemic which we were entirely unable to diagnose from a clinical standpoint alone.

INVESTIGATIONS IN REGARD TO THE ÆTIOLOGY AND DISSEMINATION OF THE DISEASE IN MANILA.

In the early days of the epidemic, when the so-called Farola district was apparently well infected and a number of cases had occurred there, visits were made from house to house and cultures taken from various foods and from numerous samples of water found in these houses, as well as from linen and articles of clothing collected there. In these cultures we were more successful in isolating the spirilla of Asiatic cholera than in those taken later in the epidemic. Out of 311 cultures the cholera spirillum was obtained from seven. The positive ones were: One from a dish of mixed rice and fruit, which was found on the floor alongside of a cholera patient; one from a barrel half full of water, located just outside of a nipa house, in which four cases of cholera had occurred, and five from cultures made from linen collected from these houses, which had probably been used to cover the sick patients. In other portions of the city where cholera was prevalent cultures have in like manner been made, particularly from various food stuffs, and also from other articles found in the houses where the cases had sickened. Some rather curious instances were encountered in regard to the examination of these food stuffs. In one Spanish convent in which we happened to be present a large cold ham had been prepared for a meal. This, on being cut in our presence, was found to contain several living diptera (maggots) in each of the slices. The authorities of the convent seemed to resent its destruction. Altogether, including the examination of food stuffs in these houses and from the various markets, 1,134 cultures have been made. Cholera spirilla have been isolated in but three of these cases—in two cases from dishes of mixed hashed foods, and in one case from a small earthen jar containing a pea-soup-like liquid. The method used in the isolation of the spirillum from these articles was as follows: An emulsion of the suspected substance was made in a tube of Dunham's solution, after which the procedure was similar to that used and described for the isolation of the cholera spirillum from feces.

EXAMINATION OF THE CITY WATER SUPPLY.

The city water supply has been under constant surveillance since the beginning of the epidemic, but at no time has it been found by bacteriological examination to be infected with cholera spirilla. The method of examination has been as follows: Three hundred cubic centimeters of suspected water were added to 100 c. c. of double-strength peptone (2 per cent solution), containing 1 per cent of sodium chloride. The mixture was then incubated in an Erlenmeyer flask for from eight to twenty-four hours and plate cultures were then made from the surface growth. After from eighteen to twenty-four hours the colonies developing on the plates were studied morphologically. A portion of each colony which consisted of spirilla was then planted on gelatine, glucose-agar, agar slant, and peptone solution. After twelve hours the indol reaction was tested in the peptone tube. So far no organism found in the water has resembled the spirillum of Asiatic cholera sufficiently to make animal inoculations necessary for its determination, though several spirilla resembling it in morphology and somewhat in cultural characteristics have been encountered.

EXAMINATION OF WATER FROM WELLS.

Upon the request of the board of health the waters from ninety-three wells have been submitted to bacteriological study. In no case has the cholera spirillum been found present, though in six the wells were found to have been probably contaminated with fecal discharges, as was shown by the large amount of nitrates and nitrites which these waters contained, and from the fact that varieties of colon bacilli were isolated from them. In examining the incubated flasks containing the water from several of these wells, mixed with peptone solution with nitrite-free sulphuric acid, the nitroso-indol reaction was obtained. The cholera spirillum was not, however, found in them, but the colon bacillus was recovered, and the action of the latter organism on the media, together with the nitrite present in the water, evidently gave rise to this reaction.

In the examination of the city water supply, while, as has been stated, cholera spirilla was never found, it is interesting to note that amebæ and several varieties of mastigophora were frequently cultivated in large numbers. Amebæ were found in about one or two out of every four or five examinations. While the evidences of the pathogenesis of these varieties of sarkodina were not demonstrated, their presence merely shows how very unsafe the use of this water for drinking purposes should be considered, unless it has been thoroughly boiled or filtered.

THE STUDY OF FLIES.

As well-authenticated cases are related in which flies have appeared to carry the infection from cholera dejecta to various articles of food, an experimental study was made in regard to the ability of these insects to convey the disease. Out of 27 house flies (Musca domestica) fed upon fresh cholera stools, cholera spirilla were isolated from the intestines of 13 after twenty-four hours. Out of 318 flies captured in the bedrooms and about the houses where cholera cases had occurred, only one was found to be infected and this one was captured while feeding upon a cholera stool in a receptacle. Doubtless, during this epidemic of cholera, these insects have served to disseminate the disease to a small extent, but the early disinfection and close watch kept over excreta in cholera cases has probably served to reduce this to a minimum.

RÉSUMÉ.

From these experimental studies, we are inclined to believe the chief means of dissemination of Asiatic cholera during this epidemic to have been through food stuffs. In support of this are the facts that cholera spirilla have been isolated from certain articles of food, while we have failed to isolate them from water except in one instance, in which the barrel containing the water was probably infected secondarily in some way. Also the fact that the cases have usually occurred successively, and that large numbers of people have not been attacked simultaneously, as they were, for example, in the Hamburg epidemic, argues against the idea that the disease has spread through the water supply.

Cholera organisms were on several occasions isolated from linen and bedclothes found on the floors of cholera houses, and, as is well known, the natives often cover their fruit with cloths while taking it to market. This, perhaps, offers a fair explanation of one means of the dissemination of the disease. As is well known, in spite of the quarantine on a great many fruits, many people almost entirely subsisted upon this diet, even if certain kinds were not placed in the markets for sale. The early disinfection in the houses in which cholera cases have occurred has seemed to be the most important and efficient means the board of health has adopted in limiting the spread of the malady, which again argues against the infection of the general water supply as being the chief means of the dissemination of the disease.

It may be added that in several cases occurring in intelligent individuals it has been impossible to get any history of their having drunk any unboiled water, and as they were the only individuals of the household attacked, there is a possibility in these cases that some single article of food of which they had partaken had been infected through flies.

It has been interesting to note the effect which the humidity has had upon the epidemic and to observe how with each marked rise the number of new cases has increased.[a] The dark and cloudy days are evidently more favorable to the biology of the cholera spirillum than those on which the sun shines and when the disinfecting powers of its rays are more strongly felt.

Dengue Fever.

During the past few months this disease has been very prevalent in Manila, and some experimental work has been performed in regard to its etiology.

As early as 1885 J. W. McLaughlin,[b] in a study of an epidemic of the disease occurring in Texas, held that he had discovered and isolated the specific organism from the blood of the patients affected. It was claimed that this organism, a micrococcus, was found both in fresh cover-slip preparations and in cultures taken from the blood. The unique feature of this coccus, according to the author, was the peculiar manner in which the bacteria grouped themselves when grown on artificial media. The blood of the patient was used first as a culture media for the organism contained therein. In 1897, in another epidemic of dengue fever in Texas, Gamon took up this work and succeeded in isolating a coccus from the blood of one case, which, however, presented some differences from the organism described by McLaughlin, and which the author considered perhaps a variety of one of the pus organisms. It was, however, not pathogenic for rabbits in large doses. No further confirmation of this work has been made.

Quite recently H. Graham,[c] in an epidemic at Beirut, Syria, has claimed to have found an ameboid form in certain of the red blood corpuscles of those sick with the disease, and subsequently he was able to discover it after careful examination in all of the cases, without exception, which he examined. One hundred cases were studied. He describes this parasite as resembling in many ways the plasmodium malariæ, or particularly Pirosoma bigeminum, but its cycle of reproduction is so much longer than that of the malarial parasite that it is difficult to follow. It may be seen either in the center of a red blood corpuscle or sometimes at the margin.

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[a] Dr. Southall has prepared a chart which admirably illustrates this point. This will appear in the report of the board of health.

[b] Dengue Fever, System of Practical Therapeutics, Hare, Vol. II, 1901.

[c] Medical Record, February 8, 1902.

From time to time it changes its shape, showing ameboid movement and shifting its place from one part of the corpuscle to another. This hematozoon is unpigmented. Flagellated forms are described, which, however, only developed after the blood had stood for some time. The author states that the parasite need not be mistaken for a vacuole, as it is too dull in color and lacks the clear brightness seen in a vacuole.

During the present epidemic in Manila we have carefully sought for this plasmodium in the blood, and attempts have also been made to isolate the coccus which McLaughlin described. From our studies on the blood in this disease we have arrived at the following conclusions: (1) In dengue fever there is no leucocytosis. (2) The differential counts of the white corpuscles in this disease show normal proportions of the several varieties. (3) The hematozoon described by Graham has not been found present in the circulating blood of our cases. (4) The micrococcus described by McLaughlin has not been encountered. (5) The etiological factor in this disease is as yet unknown. Experiments are now being undertaken to determine whether the disease is disseminated by mosquitos, as Graham has claimed.

Intestinal Parasitic Diseases.

INFECTIONS WITH STRONGYLOIDES INTESTINALIS.

There have been 12 cases of infection with *Strongyloides intestinalis* encountered during the past six months. All of these patients have suffered at times with intestinal disturbances. Intermittent diarrhea has been the most constant symptom, in some, however, of a very mild type. One patient complained considerably of attacks of vertigo. During the previous year I reported 13 cases of infection with this parasite occurring in Manlia.[a] We, therefore, have now had 25 cases under our observation. Notwithstanding the fact that many of our text-books of medicine apparently attach little importance to *Strongyloides intestinalis*, with our present knowledge concerning the parasite, it does not seem as if we can be justified in considering it an innocent commensal of man. While in cases of moderate infection the symptoms of the disease may be very slight or even wanting, as they are, indeed, sometimes in mild cases of ankylostomiasis, yet when we study the histological sections of the small intestine from those who had been infected during life and for long periods of time with this parasite, we usually find distinctive changes. Golgi and Monti[a] and the author[b] have described lesions in the mucosa of the small intestine consisting chiefly of catarrhal inflammation with desquamation and in many places atrophy of the epithelial cells. Sonsino[c] also found the parasites in the mucosa of the small intestine. In two cases of the author[b] the solitary follicles were also swollen, and there were infiltrations of small round cells about the glands containing the parasites. All through the mucosa the adult forms together with their ova and embryos were found. In some cases the embryos were situated beneath the epithelium of the villi. More recently Askanazy[d] has demonstrated that the worms may penetrate into the mucosa and sometimes into the submucosa, and *O. Leichtenstern*, in a letter to Askanazy, states that in another case he also observed the parasites to have entered into the submucosa. During the past year M. V. Kurlow[e] has reported another case of bloody diarrhea in which characteristic changes were also found in the small intestine. The parasites were situated in and beneath the mucosa. In the light of such observations regarding the pathology of this infection we can see no reason to change our views in regard to the pathogenesis of the parasite. Clinically, when present in large numbers and for considerable periods of time, it is probably capable of causing intestinal disturbances, of which intermittent diarrhea is the most common symptom. Anatomically, an intestinal catarrh is produced. All the evidence thus far submitted seems to show that it is by the mechanical action of the parasite that the disturbances arise. Probably cases of mild infection continue for long periods of time with no apparent symptoms.

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[a] Strong: Circulars on tropical diseases, February, 1901, Manila, P. I.

[b] Note sur une question helmintologique. Archives Ital. de Biologie, V, p. 395.

[c] Cases of infection with *Strongyloides intestinalis* (first reported occurrence in North America), The Johns Hopkins Hospital Reports, Vol. X, Nos. 1-2.

[d] The casi di malattia da *Rhabdonema intestinale* e Rhabdonemasi. Riv. gen. Ital. di clin. med., Pisa. Supl., 47-56 (Jul. 20).

[e] Centralblatt f. Bakteriologie, etc., I, Bd. XXVIII, 1900.

ANIMAL DISEASES.

SURRA.

During my absence in America, in the latter part of October, 1901, Dr. Slee, assistant veterinarian of the board of health, brought to this laboratory a specimen of blood from a horse suffering from an unrecognized disease. This was examined by Dr. J. W. Jobling, assistant bacteriologist of the laboratory, and a parasite was found therein. Upon receiving this information, the malady was studied by Asst. Surg. A. M. Smith, U. S. Army, and Surg. J. J. Kinyoun, U. S. Marine-Hospital Service, and reports were made of the disease. Later the affection was recognized as surra, and it was found that carabao here were also afflicted. Recently this disease and other forms of trypanosomiasis have attracted considerably the attention of the scientific world. Among the investigators that have contributed during the past and the present year to the literature regarding these subjects may be mentioned: Salmon and Stiles,[a] Laveran and Mesnil,[b] Nocard,[c] Rogers,[d] Voges,[e] Jurgens,[f] Schilling,[g] Rost,[h] Leger,[i] and in the Philippines, Smith and Kinyoun, and Curry and Slee. Drs. Salmon and Stiles, in their Emergency Report on Surra, have reviewed the literature of the subject up to March, 1902. This is the most exhaustive report that has as yet appeared and is one of inestimable value. The reader is referred to it for any knowledge desired regarding the malady up to the date of its publication. Since its appearance, Laveran announced to the Academy of Sciences on April 1 the results of his experiments and search for a means to combat this disease. He reported that subcutaneous injections of human blood serum into mice infected with nagana, and having large numbers of trypanosoma in their blood, causes the temporary disappearance of the parasites from the circulation in these animals. He thought the power of destroying the parasite was possessed by the human leucocytes, for the blood plasma was inactive. Heating the serum to 52° C. for one hour caused it to partially lose its activity. Heating it to 62° C. for the same length of time still further weakened it. Some hope was therefore expressed by certain of our medical journals that the cure for this disease had been found. We had already previously tried injections of human blood into monkeys suffering from experimentally produced trypanosomiasis from injections of *Trypanosoma evansii*, but found, while the parasites disappeared temporarily, after a few days they were always again present in the circulating blood. Goat's blood and bile from monkeys that had died of the disease were also tried, but with like results. Goat's serum was used, as these animals are relatively immune to the parasite. Experiments with the intravenous injection of benzoyl-acetyl peroxide will be performed as soon as the animals for experimental purposes can be secured. The difficulty experienced in obtaining proper animals has seriously hampered the work of the laboratory throughout the year.

It seems that it is chiefly through its mechanical destruction of the red blood corpuscles that the trypanosoma causes harm. Some experiments were performed to show whether the parasite elaborated any toxic substance which acted injuriously upon its host. Large amounts of blood taken from monkeys suffering with experimentally produced trypanosomiasis of severe type were passed through a Berkefeld filter and the filtrate injected into other monkeys. No symptoms of trypanosomiasis were produced. Large celloiden capsules containing blood with many parasites were placed in the abdominal cavities of sheep, but the results were also negative.

While Laveran and Mesnil maintain that man appears absolutely refractory to the disease nagana and that human blood serum in fact will destroy the parasites, these statements must be accepted with caution, particularly as Dutton[j] has recently reported the discovery of a species of trypanosoma in man. This species resembles to a certain extent the *Trypanosoma brucei*, but was somewhat smaller than this parasite. This is only the second instance in which a parasite of this genus has been reported in man. The first two cases were published in 1898 by Nepveu,[a] from South America. In both of them malarial parasites were also present in the blood. His description of the trypanosoma is incomplete. As yet we have met with no case of human infection in the Philippine Islands.

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[a] Emergency Report on Surra, 1902. American Medicine, February 8, 1902.

[b] Comptes rendus Société de Biologie, March 29, June 28, 1901. Comptes rendus l'Accademie de Science, July, 1901; October 28, 1901; April 1, 1902. Annales de l'Institut Pasteur, September 25, 1901; January 25, 1902.

[c] Comptes rendus Société de Biologie, May 10, 1901.

[d] Proceedings of the Royal Society of London, May 4, 1901.

[e] Zeitschrift für Hygiene und Infektionskrankheiten, March 13, 1902.

[f] Archiv für Hygiene, Bd. 42, 3.

[g] Centralblatt für Bakteriologie, Parasitenkunde und Infektionskrankheiten, Bd. 31, 10.

[h] Journal of Pathology and Bacteriology, June, 1901.

[i] Comptes rendus Société de Biologie, vol. 12, No. 12, 1902.

[j] British Medical Journal, January 4, 11, 1902.

In regard to the treatment of surra in animals, it seems that as yet there is no cure for the malady, and in horses at least it is apparently almost universally fatal. Experiments to find some means of combating the disease are still in progress in the laboratory. Until some successful method is found, however, it would seem advisable to destroy at once all horses suffering from this disease, unless they can be strictly isolated and protected from biting insects.

RINDERPEST.

Experiments performed here have recently shown that the rinderpest of the carabao (*Bubalus kerabau*) is apparently the same variety of the disease as the common rinderpest of cattle. Indian cattle inoculated with blood taken from a carabao suffering from rinderpest have developed and died with all the symptoms of the disease. This shows the fallacy of the popular idea among many cattle dealers here that foreign cattle will not take carabao rinderpest, and that if allowed to run with an infected carabao herd they will not contract the disease. A large herd of cattle have recently been highly immunized against rinderpest, and a considerable quantity of antirinderpest serum has been prepared and is now ready for use. Experiments are also being undertaken in regard to the etiology of the disease. Appropriations to provide cattle and attendants, as well as pasturage, will be necessary to enable the Serum Institute to continue this work successfully, and to immunize imported cattle.

CONTAGIOUS LYMPHANGITIS.

A few months ago a form of pseudo-farcy was found to exist in the Philippine Islands. Following is the report made from the laboratory on June 26 regarding this malady:

PRELIMINARY REPORT OF THE APPEARANCE IN THE PHILIPPINE ISLANDS OF A DISEASE CLINICALLY RESEMBLING GLANDERS.

Veterinarians and owners of horses are advised that an infectious disease which may clinically at times closely simulate farcy (the nodular, cutaneous form of glanders) has been found to exist in the Philippine Islands. My attention was first called to this malady by Dr. J. G. Slee, veterinarian of the board of health, Manila, who sought aid from the laboratory in the diagnosis of the disease with which several horses were afflicted, and requested an examination of these animals for glanders. That this malady sometimes closely resembles the cutaneous form of glanders may be evidenced from the fact that in the first case encountered a diagnosis of farcy had already been made by three veterinarians. Upon a microscopical study of material removed from the pseudo-farcinous buds, however, it has been possible to show that the disease under discussion is of an entirely different origin from glanders. Indeed, while farcy is an affection which owes its origin to one of the schizomycetes or fission fungi (bacillus Mallei), the malady under consideration, it seems, is not due to bacterial infection at all, but to a parasite of an entirely different group, namely, one of the budding or yeast fungi (a blastomyces).

Clinical manifestations.—The disease starts as a small nodule situated in the cutis and frequently in the neighborhood of some slight abrasion. The primary node usually appears upon one of the extremities or in the cervical or abdominal region, but may be situated on the shoulders or chest. From the first nodule the infection spreads, apparently along the course of the lymphatics, and eventually many buds form. Frequently the adjacent lymphatics become swollen and arranged in a row, presenting somewhat the appearance of beads on a rosary. The nodules vary in size from about 5 mm. to 3 cm. in diameter. The hair is preserved over the younger tumors, which at first are hard, but usually soften later and form larger abscesses. If left to themselves, they generally finally open and leave ulcers with margins, which are usually irregular. When the abscesses are incised in their early stages they are found to contain a bloody, purulent, tenacious material. The contents of the older tumors is yellowish white, gelatinous, and very tenacious. When the cervical region is affected, the submaxillary glands are not uncommonly swollen, and the lymphatic glands near the other parts involved are usually enlarged, soft, and freely movable. The disease extends gradually, and in neglected cases may spread over almost any part of the body and even invade the nasal mucosa. A mucous discharge from the nose then appears, and the picture now more closely resembles glanders. We, however, have not yet seen the primary nodule situated in the nares. In the cases observed, there seems to be no tendency for the process to invade the scrotum, testicles, or penis. Indeed, though there have been nodes very near these organs, there has so far been no involvement of them. In the fairly severe cases there may be some general disturbances, such as slight fever and loss of appetite. In the severe ones anemia and cachexia appear in addition. The mild ones may run an almost afebrile course.

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[a] Comptes rendus Societe de Biologie, December 30, 1898.

While glandular metastases occur, metastases in the internal organs have not as yet been observed. Occasionally sinuses form in the subcutaneous and deeper muscular tissues. The disease runs a chronic course and may last for months, but the prognosis is usually favorable and a very large majority of the animals eventually recover. Cattle are sometimes affected with this malady, but it is not so common in these animals as in horses.

Ætiology.—As has been stated above, upon microscopical examination it was very soon seen that the disease had an entirely different origin from glanders. Cover slip preparations and cultures made from many early and late nodules showed no bacteria. In a few instances micrococci were found present, but it seemed likely that these organisms had invaded the lesions secondarily from the skin, as it was particularly in the older and more superficial abscesses that they were encountered. In no case have bacilli been met with either in cover slip preparations or on the various culture media employed. In fresh microscopic preparations made from material of the nodes, while the absence of bacteria is noticeable, what is still more striking is the presence of numerous oval glistening bodies measuring from about 4 to 5 μ long by about $3\frac{1}{3}$ μ wide, and presenting a double contour. These bodies are found lying both free and inside the cells. In specimens of the pus stained with Ehrlich's triacid solution, the cells which contain the parasites are seen to be generally of two varieties, namely, large endothelial phagocytes and polymorphonuclear neutrophiles. Inside the cells these oval bodies generally appear in the hardened specimens as clear, glistening spots somewhat resembling vacuoles. Often from three to five may be seen in one cell. Frequently they do not stain with the aniline dyes. Even after prolonged treatment with carbol fuchsin, most of them remain clear, though some show a deeply staining point, which is usually placed eccentrically, or others inclose several deeply stained granules. Occassionally there is some staining at the periphery of the body while the central part remains clear. A smaller number may, however, uniformly color a fairly deep red or assume a pinkish tinge. In specimens of the pus carefully hardened at a low temperature, treated with carbol fuchsin and mounted in water, while one still finds a large number of clear ovals, many others are stained a deep red and some of an eosin color. It can not be said that the age of the blastomyces is the only factor which determines this affinity for the dye, as many young cells stain poorly, while occasionally older cells color intensely. From these preparations, however, it is easy to see that the glistening oval bodies observed in specimens hardened in alcohol and ether or hardened without certain precautions are the empty capsules of the blastomyces from which the protoplasm has in some way escaped. In the specimens mounted in water it is very common to find one or several deeply colored staining granules situated inside of the clear capsule and endowed with very active Brownian movement. We have not been successful in staining the empty capsules with the methods employed in coloring the capsules of bacteria, nor have we been able to obtain any apparent reaction with the iodine stains. Frequently there is the appearance surrounding the oval bodies of a ragged envelope which stains faintly. The capsules may be made very distinct by treating them with dilute acid or alkaline solutions.

The exudate from the nodules is very rich in cells and consists chiefly of large phagocytic cells and polymorphonuclear neutrophiles. In addition to red blood corpuscles, there are a fair number of small round mononuclear cells, some eosinophiles, and a few plasma cells. A few of the neutrophiles show iodophilia with Ehrlich's stain. The exudate also contains a large amount of fibrin.

Cultural properties of the blastomyces.—The organism does not grow well on bacteriological media, such as plain agar, glucose, maltose, saccharose, and beer-wort agar or bouillon and potato. After from seven to ten days, on glucose or wort agar, sometimes a very delicate growth may be observed along the track of the needle on the surface of the media. Cover slips show that the organism is living and slowly reproducing itself. Small portions of the material removed from the nodule and mixed with a small quantity of bouillon or agar in a hanging drop show numerous budding forms after from forty-eight to sixty hours in a moist chamber. After a still longer time jointed hyphae may be noted, and later formations of lateral and terminal conidia. In the protoplasm of the cells may be frequently seen vacuoles and bodies resembling oil drops. No fermentatian of any of the sugars has as yet been observed.

We have been successful in producing small nodules in one monkey by subcutaneous injection of material containing the blastomyces.

Differential diagnosis.—The disease briefly reviewed above is not to be confused with that termed "Bursatte" in India, as described by F. Smith as being due to a "mold fungus," or with that known as "farcin du boeuf," an affection of cattle which exists in the West Indian islands, especially Guadeloupe, and which owes its origin, according to Nocard, to a streptothrix, or more correctly, to an actinomyces. It is, however, probably very closely related to the variety of lymphangitis epizootica studied particularly by Fermi and Aruch and to a similar infection described by Tokishige in Japan. Rivolta had previously noticed certain highly refractive bodies constantly present in the pus from nodules of cases of lymphangitis epizootica, which he termed *Cryptococcus farciminosus*. By other observers these bodies have been considered as coccidia or as sporozoa. In the Japanese variety the scrotum penis, and testicles are particularly liable to infection, and metastases of the lungs may occur and even changes in the periosteum of the bones and cartilages. Tokishige considered a saccharomyces which he named *Saccharomyces farciminosus* to be the true etiological factor in this disease. Nevertheless it appears that his organism was rather to be classed as oidium. The organism described by Fermi and Aruch differs considerably, however, from that regarded by Tokishige as the causative agent. The former observers obtained colonies on potato cultures after three days. The cells were rounded or oval, and buds formed at the ends. Hyphae were not mentioned. Tokishige's saccharomyces required from thirty to fifty days for development on artificial media, and in time the surface then became folded like coils of the intestine. Microscopically hyphae and yeast cells occurred together.

As our organism as yet shows no tendency to ferment sugars, we prefer to consider it, for the present at least, as a blastomyces. The disease is still under study in the laboratory, and a more complete report will appear at a later date.

The diagnosis can usually be suspected and in many cases made in the following manner: A small amount of material from a freshly opened nodule should be transferred, preferably by an oese, to a glass slide and covered with a cover glass which is gently pressed down. On examination with a moderately high power (Zeiss DD, Oc. 4) numerous glistening ovoid bodies with a double contour, as described above, may be seen in the field of vision. The diagnosis should be confirmed by cultures.

Treatment.—On the appearance of the first node the hair should be shaved for a considerable distance around it, the nodule opened early, curetted, cauterized, and thoroughly cleansed with some antiseptic solution, such as benzoyl acetyl peroxide,[a] bichloride of mercury, or creoline. Applications of formalin have also given good results. A 1 to 1,000 solution of benzoyl acetyl peroxide should be injected subcutaneously completely around the early tumor with the hope of limiting the extent of the disease. As each new node appears it may be treated in like manner. The skin in the neighborhood of the tumors should be kept perfectly clean. It is advisable to thoroughly irrigate the open ulcers at least twice a day. In the interval some ointment, such as iodoform or sulphur, should be applied.

Veterinarians and owners of horses are advised before destroying animals suffering from supposed farcy to have microscopical examinations made from the nodules of the infected animals at the Government biological laboratory. It seems probable that a number of horses suffering with this disease have already been destroyed. As has been stated above, a large majority of the cases eventually recover, although the disease may persist for months.

JUNE 26, 1902.

Since the publication of this report numerous other cases have been observed. It has been found possible to convey the disease by direct inoculation from one horse to another. Therefore an intermediate host is not necessary to reproduce it, and the disease is a contagious one. The incubation period for the disease is about one month—that is, the primary lymphatic nodule becomes apparent after about this length of time from the date of inoculation.

HOG CHOLERA.

Dr. Richards, veterinarian of the board of health, was the first to suspect the presence of this disease in Manila hogs. With his assistance a number of the killed hogs were subjected to autopsy and bacteriological examination. The characteristic lesions of the disease were found and the bacillus cholerae suis isolated from the spleen and lymphatic glands of several of the cases. Fortunately the number of infected hogs here so far has been small.

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[a] Generally termed "benzozone" or "acetozone."

LOCUST FUNGUS.

The bureau of government laboratories obtained tubes of fungus from Cape Colony and from Washington, D. C., in December, 1901, and using these as a basis it prepared cultures in large quantity, which were shipped to all of the provinces. Great difficulty was experienced in obtaining reports as to its use, and in some cases it was discovered that this means of exterminating the locusts was avoided because of the fear of sickness resulting from eating the grasshoppers destroyed by it. It will probably be some time before this prejudice can be overcome and the use of the remedy become general. Such reports as have been transmitted to this office have been encouraging, and the distribution of the cultures is being pushed as vigorously as possible.

Fungus shipped to provinces.

	Number of tubes.
1901.	
October	97
November	61
December	46
1902.	
January	6
May	48
June	29
July	42
August	40
Total	379

Reports received.

Date.	Province.	Report.
Nov. 13, 1901	Pangasinan	Reports use of fungus without result; believed to be on account of dry weather.
Jan. 18, 1902	Ilocos Norte	Reports that fungus is not used on account of probable danger to natives eating locusts dying from fungus disease.
Jan. 22, 1902	Albay	Reports that about two weeks after distribution of fungus all locusts disappeared from the province; dead locusts found in great numbers.
Feb. 27, 1902	Leyte	Reports use of fungus and liberation of diseased locusts in swarms; that many were found dead after the passing of the swarm, with same general appearance as those of the locusts which died in captivity of fungus disease. On account of dry season sick locusts were left behind and swarm was not destroyed.

The following letter from A. F. Dennhardt, who made intelligent use of the remedy, gives as good an indication as any of the results to be obtained:

SANTA MARIA DE PANDI,
Bulacan Province, P. I.

SUPERINTENDENT OF GOVERNMENT LABORATORIES,
Manila, P. I.

SIR: I have the honor to report as follows concerning tests made with "locust fungus" furnished by the bureau of government laboratories:

1. Test unsatisfactory owing to climatic conditions and failure of foreman in carrying out instructions.
2. Test made with 100 locusts confined with one infected by dipping in preparation of the fungus. Result: Entire 100 killed within twelve hours.
3. Test made on afternoon and night of July 23. Climatic conditions: Heavy rain. Time of infection: 4 o'clock in the afternoon. Place of test: On plantation of Philippine Sugar Estate Development Company at Cupang, plantation of Pandi, Bulacan Province. Method: Eight or ten locusts were captured and released in the swarm then resting on the fields after being infected by dipping in the "locust fungus," pre-

pared according to directions sent out by the bureau of government laboratories. Result: On the morning of July 24 over thirty cavanes of dead locusts were found in the vicinity of the place where the infected locusts were released, none found in places not infected, and the remainder of the swarm had left the plantation. The last test has proved so highly satisfactory that it is my intention to follow it up with systematic work with the "fungus," not only in this province, but on the properties of the company in Laguna Province, from where I will be pleased to send you a further report.

I find that the most satisfactory time for infection is during rainy weather, releasing the infected locusts at nightfall.

Very respectfully,
ANTONIO F. DENNHARDT.

OTHER MISCELLANEOUS WORK.

Owing to the fact that a case of human infection with *Balantidium coli* was encountered in Manila during the preceding year,[a] a search for the parasite has been made in the intestines of the native hogs brought here for slaughter. About 4 per cent of these animals were found to be infected with the infusorian. We may, therefore, be on the lookout for other instances of human infection. A study of the clinical and pathological significance of *Balantidium coli* has recently been pursued. The report is too lengthy to appear here, but will shortly be published elsewhere.

Experimental and clinical studies on amebic dysentery have been performed, which will also be published as a separate report.

GOVERNMENT PHOTOGRAPHER.

During the fiscal year the bureau of government laboratories purchased a complete equipment for the government photographer, Mr. Charles Martin. The work undertaken was varied. During the year three trips were made outside of Manila—one to Bangued, Abra, where the photographer joined the governor of the province, and the others with the chief of the mining bureau to the region near Angat, Bulacan. Two hundred and eighty-six views were taken. In Manila work has been done for the board of health, bureau of architecture, bureau of non-Christian tribes, bureau of forestry, and the honorable the secretary of the interior. In all about 2,200 prints have been made.

I am, very respectfully,
PAUL C. FREER,
Superintendent of Government Laboratories.

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[a] Strong and Musgrave: Bulletin Johns Hopkins Hospital, February, 1901.

APPENDIX N.

REPORT OF THE CHIEF OF THE BUREAU OF PUBLIC LANDS FOR THE YEAR ENDING AUGUST 31, 1902.

BUREAU OF PUBLIC LANDS,
Manila, September 1, 1902.

HON. DEAN C. WORCESTER,
Secretary of the Interior.

SIR: I have the honor to make the following report of the operations of this bureau from the date of its creation by act No. 218, United States Philippine Commission, dated September 2, 1901, up to September 1, 1902:

The act creating the bureau provided for the appointment of a chief of the same and a chief clerk. The former was appointed on September 4, 1901, and on the 17th of the same month Mr. Gregorio Basa, who had acquired an intimate knowledge of the Spanish land laws during eighteen years of service as an employee of the Spanish Government, and who for more than a year had been in the service of the United States Government in the forestry bureau, was made chief clerk.

At the time of organization of the bureau it was impossible to obtain any suitable quarters in which to begin work, and this inconvenience was not overcome until late in October, when through your kind efforts the bureau was provided with four rooms on the ground floor of the former ayuntamiento building in the walled city of Manila. Several weeks were occupied in placing these quarters in a proper condition for the reception of the Spanish land titles which were to be transferred to the bureau from other government offices, and it was the end of November before the bulk of these papers were received. In the meantime, through the courtesy of Mr. Albert E. McCabe, the then acting chief of the forestry bureau, the chief and the chief clerk of this bureau were furnished with desk room in the rooms of the former, and there did the preliminary work necessary to the organization of the bureau of public lands.

For lack of time and of many of the necessary books, a study of the Spanish land system as applied to the Philippine archipelago was undertaken with many doubts as to the correctness of any opinion that might be expressed upon such insufficient data and under circumstances requiring a rapidity of examination incompatible with the accuracy of result so much to be desired in a matter of such importance in the future settlement of the titles based upon Spanish concessions in these islands. A memorandum as to the Spanish land system in the Philippines, with observations as to certain advantages of the land system of the United States was prepared, in compliance with the personal request of the civil governor, in October of last year, which, although of necessity unsatisfactory to the bureau, was the best that could be done in view of the absence of facilities for study and for lack of time. Knowledge acquired since then has not materially changed the views therein expressed, but the fact is recognized that the conditions existing in the Philippines are of a character that may require, in some respects, a departure from methods which, as a result of long familiarity, have been considered as the only proper ones to follow in extending a system of surveys over large areas of public land.

Also, at the request of the civil governor there was prepared a sketch of the difficulties encountered in the application of the American system of surveys to the public lands in certain portions of the United States that formerly belonged to Spain and Mexico, and in the adjudication of the rights acquired under grants of land issued by the Governments of those countries. It was assumed in preparing this sketch that the experience gained by the United States in those regions and through those adjudications might be useful in the future settlement of similar questions in the Philippines. This is still believed to be true, but it is highly probable that the difficulties to be encountered here in endeavoring to bring into order the chaotic condition of titles to land in these islands will prove to be greater than any of those that were met with in the former Spanish possessions that were acquired by the treaty of Guadalupe Hidalgo and the Gadsden purchase.

The sketch and memorandum above referred to were printed as Appendixes F and G to the Report of the United States Philippine Commission to the Secretary of War for the period from December 1, 1900, to October 15, 1901, to which attention is respectfully directed.

The civil governor, shortly before his departure for the United States last December, asked this bureau for an expression of its views as to what it considered the best method of surveying the public domain of these islands. In a letter dated December 16, 1901, it was suggested that the work could be best carried on by making arrangements with the Director of the Geological Survey of the United States, by which a system of rectangular surveys similar to that of the United States could be combined with a geological survey of the islands. This method was suggested by the fact that the Indian Territory was surveyed some years ago in this manner, and as a result thereof the work was much better executed than had formerly been the case under the contract system so long in use in the United States, and at a considerable saving in cost.

Among other advantages of the method proposed are these: The work would be in the hands of men of high character, scientific training, and long experience in the field; greater accuracy would be attained in its execution than could reasonably be expected under the contract system; the scandalous abuses that arose in the United States under that system would be avoided; and the cost would probably be less than by any other method possessing equal or similar advantages.

The surveying of the public domain in the Philippines will require many years, and it is highly important that we should have the work executed in a manner that shall reflect credit on American administration of affairs and be of lasting benefit to all whose interests may hereafter be influenced by the degree of accuracy with which it may be carried out. That these results will be attained by the method proposed is the firm conviction of this bureau.

Late in November, 1901, the bureau received from the forestry bureau and the bureau of archives 222 bundles of expedientes relating to sales, composiciones, and gratuitous concessions of land, and many other kinds of documents connected with the same; also, 76 record books and 64 other books referring to land boards in the Visayan Islands and to reports of daily operations by certain forestry sections and districts. These were received in compliance with the provisions of paragraph 1, section 3, of the act creating the bureau. Subsequently this bureau was furnished by the bureau of archives with a collection of the Gaceta de Manila, the official publication of the Spanish Government in the Philippines, covering the period from 1870 to 1897, both dates inclusive.

The exact number of expedientes and other documents in the bundles above referred to is not yet known, as their orderly arrangement has not yet been completed, and, with the present office force, can not be for some time.

It was the intention to examine without delay all of these documents for the purpose of arranging in tabulated form the data therein contained with a view to promptly furnishing the public, upon application, with information in regard to the Spanish titles intrusted to the custody of the bureau. This work was delayed, however, by the impossibility of promptly obtaining through the ordinary channels paper of sufficient size to contain the tabulated forms deemed necessary, and it was not begun until the latter part of January of the present year. Two clerks were then put at the work under the immediate direction of the chief clerk, who himself was for a long time compelled to give his personal attention to its details as the former were persons without previous experience. This work was continued without intermission until early in June, when the necessity of making numbers of certified copies of documents in the archives compelled its suspension, since which time little has been done in that line. During the time this work was carried on, the number of expedientes of sales examined and entered on the tabulated forms was 1,882 and the number of expedientes of composiciones was 6,596, making a total of 8,478. While it is not possible to state how many expedientes and other documents remain to be examined, it is believed that the number is not less than 20,000. The great majority of these are thought to be documents of slight importance, as many are scarcely more than notes or memoranda relating to the principal expedientes. When this work shall be completed, it is the intention to make an alphabetical index of the names of the applicants and grantees, which will greatly aid in the search for old and titles, about which numerous inquiries are constantly made.

It is hoped that the tabulated forms regarding these old papers will be so full as to avoid in the near future, at least to a considerable extent, the necessity of much handling of the documents themselves. These forms will show:

Name of the petitioner; name of the concessionary; date of the petition; name of the place, barrio, and town where the land is situate; distance from the church of the town, expressed in kilometers; condition of the land, whether cultivated or not; area granted, expressed in hectares; rate per hectare; appraised value of land; appraised value of timber, firewood, etc., growing on it; price paid for land; fees paid for issuance of title; fees paid for surveying; date of the issuance of title; date of the law, decree, or regulations under which the concession was made; remarks concerning the physical condition of the documents, and any pertinent, unusual, or interesting facts connected with the proceedings.

In searching for information relative to various titles, facts have been developed that seem to indicate that there are still in the possession of the bureau of archives numbers of documents that properly should be transferred to this bureau, but this was not known to the chief of the bureau at the date of the transfer, and since that time the lack of a larger force of clerks in the bureau has thrown upon its chief many matters of a strictly clerical character which have prevented his properly investigating this and other subjects to which he hopes in the future to be able to give his personal attention.

In the month of December last this bureau began to receive applications for certified copies of documents either known or supposed to be among its Spanish land titles. Not knowing of any law authorizing the issuance of such copies, the applicants were of course refused, but the question as to the propriety of the action had was submitted through the proper channels to the Philippine Commission, and after the Attorney-General had given his opinion on the subject, the acting civil governor, on June 2, 1902, by executive order No. 93, authorized the issuance of such copies under certain circumstances and upon the payment of fees based upon the same schedule as the fees allowed by the code of civil procedure now in force in these islands for certifying copies of papers by clerks of courts. Under this authority the bureau has, during the last three months, issued 28 certified copies aggregating 43,168 words and containing a number of tracings of maps. The fees received for this work amounted to $36.10. As the only clerks in the office who can copy these documents are natives who have no knowledge of the use of the typewriting machine and who are not rapid penmen, the work is necessarily slow and the fees received are really no compensation to the government for the time occupied by the clerks in making the copies. A suggestion of a change in the provisions of executive order No. 93 will be submitted to the Commission in the near future, not only in regard to the fees, but also with a view to covering certain points suggested in the first inquiry made by this bureau in regard to its authority to issue copies and which points were not touched upon by the Attorney-General in his opinion nor made a part of the executive order under which the copies are now issued.

It is a matter of satisfaction to be able to state that frequent inquiries in regard to taking up of public lands have been made both by letter and in person during the last year by Americans who signify their intention of remaining in the islands and devoting themselves to agricultural pursuits. The Congressional prohibition that prevented the insular government from making any sale, lease, or other disposition of the public domain has acted as a source of discouragement to many persons contemplating settling in the country and operated as a hardship to men of small means who were anxious to initiate titles to agricultural and mineral lands.

It is hoped that the act of Congress approved July 1, 1902, temporarily providing for the administration of the affairs of civil government in these islands, will result in relieving the present situation. A copy of this law was received on August 14, 1902, but it has not been possible to give it that critical study that would justify the bureau in making detailed suggestions as to the amendment of several of its features which on a cursory examination appear to be subject to objection and which perhaps could be amended without prejudice to the interests of the government or to those of individuals.

The establishment of a special tribunal for the settlement of the Government's interest in properties claimed to be held under legal titles derived from the Spanish Government is strongly recommended as the most satisfactory and certain means of preventing the holding of large tracts of land under illegal, inchoate, or fraudulent claims. The period of transition through which the Philippines are now passing is one offering many opportunities for the initiation of dishonest claims to real property, and for repairing the defects known to exist in others which in their inception possessed no merit. The sooner claimants of large estates, alleging their titles to the same to be such as the Government is bound to respect, shall be compelled to seek a confirmation of those titles in a court of competent jurisdiction, the sooner it will be possible to place in operation an orderly system of surveys and provide for the alienation of the Government's title in public lands without danger of implanting here the abuses and difficulties that arose in certain parts of the United States that had formerly been Spanish possessions, and which retarded for half a century the development of a region twice as great in extent as the Philippine Archipelago.

It is understood that the honorable secretary of finance and justice has drafted a land registration act which will cover most of the ground of the preceding suggestion, but that act does not make obligatory the presentation of titles for confirmation. The experience of the chief of this bureau, extending over twenty-five years in countries formerly under Spanish sovereignty, leads him to believe that the holders of large tracts of land, being usually persons of intelligence or wealth, and sometimes both, are able to exert over poor and ignorant tenants and neighbors a despotic influence that enables them for long periods of time to maintain possession of extensive tracts to which they may have neither legal nor equitable titles, and that the most effective way to protect the interests of the Government and the interests of him who is ignorant of his rights and consequently unable to defend them, is to compel all holders of large tracts to come into court, whether they will or not, and submit their titles or claims of title to judicial scrutiny.

In addition to the work hereinbefore mentioned letters of inquiry in regard to lands have been answered, searches have been made in the Spanish archives for information sought by private individuals, other bureaus of the civil government and offices of the military government and army, and other numerous matters of detail and routine attended to. This work has been done by four employees, with the exception of about one week in May last, when there were five.

The provisions of the act of July 1 last place so much work on this bureau that an increase in its force will be necessary at an early date, and it is likely that it will not be long until it will be imperative that it should have more commodious quarters than those it now occupies.

This bureau desires to acknowledge the many acts of courtesy and accommodation that have been shown it, not only by yourself, but by Capt. George P. Ahern, Ninth United States Infantry, chief of the forestry bureau; Mr. Manuel de Iriarte, chief of the bureau of archives, and Mr. Charles H. Burritt, chief of the mining bureau.

Respectfully submitted.

WILL M. TIPTON,
Chief of the Philippine Insular Bureau of Public Lands.

APPENDIX O.

REPORT OF THE CHIEF OF THE BUREAU OF AGRICULTURE FOR THE YEAR ENDING AUGUST 31, 1902.

BUREAU OF AGRICULTURE,
Manila, P. I., September 10, 1902.

Hon. DEAN C. WORCESTER,
Secretary of the Interior, Manila, P. I.

SIR: In compliance with your communication of August 28, I have the honor to present herewith a statement of the operations of this bureau from the time of its organization to September 1, 1902, and to offer suggestions as to the future policy which existing conditions seem to warrant.

PRELIMINARY WORK.

The act of the Philippine Commission organizing the bureau of agriculture was passed April 30, 1902. Prior to that time some work had been undertaken under act 261, establishing the bureau of agriculture, and subsequent acts appropriating funds for conducting certain investigations and carrying on work at San Ramón farm and authorizing expenditures for farm machinery, seeds, etc. During this period Mr. Michael R. Healy was directed by the secretary of the interior to visit the several government farms and experiment stations enumerated in act 261, and to make reports concerning them, covering such points as the presence or absence of buildings or of equipment, their size, character of the soil, possibility of irrigation, and general condition of the reservations, and to what crops the land was adapted. Mr. Healy visited all the farms and stations which are under the charge of the bureau of agriculture, and his reports are submitted herewith (Exhibits F, H, L, M, N, O).

Under the direction of the secretary of the interior, special investigations were made by Mr. Oswald A. Steven in the islands of Cebu and Negros, with a view of determining a suitable location for the establishment of a model sugar estate in these islands. The report of Mr. Steven is now in hand (Exhibit S), but as yet no action has been taken relative to the matter because of the very considerable expense involved in carrying out the plans proposed, which the government is not prepared to meet at this time.

The chief of the bureau of agriculture, provided for in act 261, was appointed November 29, 1901, and, under instructions from the Philippine Commission, he at once took steps to secure a supply of agricultural machinery, farming tools, and seeds of American vegetables and field crops. He visited New Orleans, La., and Charleston, S. C., with a view of selecting the latest farm machinery used in cultivating sugar cane and rice, and, in addition to these special farm implements, a large consignment of general agricultural tools were procured, after careful selection, in New York City. (See report of the farm machine expert, Exhibit E.) About 2 tons of seeds were purchased from the most reputable dealers, and in the selection of these seeds, which numbered many varieties of the choicest garden vegetables and field seeds, the chief of the bureau was obliged to be guided by the general conditions which exist in tropical countries, because of a lack of any exact knowledge as to their actual suitability for the conditions to be met. This can only be determined by experiment, and it is too early yet to make any assertions on this subject. (See Exhibit A.)

With a view of securing managers for the several government farms and experiment stations, the chief of the bureau was directed to take the steps necessary for the establishment of an eligible list through the United States civil service, and such a list is now established. It is respectfully recommended that the necessary action be taken for the appointment of managers from this eligible list for the government farms and experiment stations which, by act 261, this bureau is directed to take charge of and conduct. It is urged that this action be taken at as early a date as possible, for upon some of the farms or stations there is property of value which is now uncared for, and the land which might profitably be used is now lying idle and deteriorating in value.

The chief of the bureau left New York February 24, 1902, reaching Manila via Suez Canal April 22. He was accompanied by several members of his staff, whose appointment had already been authorized, including an expert in tropical agriculture, an expert in plant culture and plant breeding, a botanist, expert in farm machinery, chief clerk, and stenographer, all secured by transfer from the civil service of the United States. En route to Manila visits were made to the botanical gardens in Ceylon and at Singapore, and reports upon these places by the botanist and plant culturist are presented herewith (Exhibits Q and R).

The insular bureau of agriculture is indebted to the United States Department of Agriculture for a large consignment of seeds for distribution here, including 50,000 packets of vegetable seeds, put up ready for distribution; a collection of 3,319 packages of miscellaneous seeds, gathered from all parts of the world by the agricultural explorers of the Department; also a consignment of selected seeds of forage plants, secured especially upon the request of the chief of the bureau for experimental use in the islands. In addition to this large and valuable consignment of seeds, the United States Agricultural Department has supplied the insular bureau with a fine set of lantern slides, a large collection of botanical specimens, and many important publications. Through the Office of Experiment Stations of the United States Department of Agriculture we have received without cost the exceedingly valuable card index to experiment station literature issued by that office. All of the items above mentioned the chief of the bureau of agriculture brought with him from the States, and they were turned over to the bureau on his arrival here April 21.

In October, 1901, Dr. S. A. Knapp, of Louisiana, visited Luzon under a special commission from the Secretary of Agriculture, and while here a letter was addressed to him relative to the cultivation of rice and certain forage crops. This letter and Dr. Knapp's reply are of so much importance, bearing as they do upon one of the most essential and widely cultivated crops of the islands, that they are presented here for publication (Exhibit X), as is also a report by Dr. Knapp to the Secretary of Agriculture relative to his observations on agriculture in the Philippines (Exhibit Y).

ORGANIZATION OF THE BUREAU AND SCOPE OF WORK.

The act organizing the bureau of agriculture, passed April 30, 1902, provided for a chief of bureau; an expert in animal industry; a chief clerk; a botanist and assistant agrostologist; a soil expert; a superintendent of San Ramon farm; one tropical agriculturist; one expert in plant culture and breeding; one expert in farm machinery and farm management; one stenographer and typewriter; one translator; an artist; a messenger, and a janitor. In act 430, making appropriations for the quarter ending September 30, 1902, this organization was increased by the addition of an expert in seed and plant introduction and an expert to conduct fiber investigations, and the duties of the botanist were enlarged to include the botanical work required by the bureau of forestry. There was also some slight increase in clerical force and a corresponding increase in the scope of the work authorized.

The work of this bureau, as now defined, covers the collecting and purchasing of valuable seeds, roots, bulbs, trees, shrubs, vines, and plants, for experimental cultivation and distribution; the investigation of the soils of the Philippine Islands and the mapping of these soils suitable for the growth of staple crops; the investigation of methods of curing tobacco and improving the varieties of tobacco, hemp, sugar, rice, fruits, and vegetables by careful selection and breeding, and the introduction of improved varieties from other countries; the investigation of grasses, forage plants, and animal foods, and the means of improving the forage supply of the islands; the investigation of the medicinal, poisonous, fiber and other economic plants; the study and history of the habits of injurious and beneficial insects and the best means for destroying those found to be injurious to agricultural crops; the study of the diseases of plants and methods of preventing them; the investigation of the live-stock, dairy, and other animal industries of the Philippines, and the improvement of existing breeds of domestic animals. In addition to this, the bureau has charge of the government farms at La Carlota in western Negros and at Magalang in the province of Pampanga, and experiment stations in the provinces of Iloilo, Cebu, Isabela, Ilocos, and Albay.

SEED DISTRIBUTION.

The first work undertaken by the bureau was to get in touch with the farmers and planters of the islands, and to secure a list of those interested in or who might be directly benefited by the promotion of agriculture, and to secure the names and addresses of those willing or desirous to experiment with the seeds we had for distribution. This work was begun by issuing a circular of inquiry asking information relative to various crops grown and to other lines of agricultural industry, with the request that those replying give the names of farmers and planters in the vicinity of the correspondent, interested in the improvement of agricultural conditions (Exhibit Z). These circulars of inquiry were mailed to the various provincial and municipal officers and through the returns received our mailing list at the present time includes nearly a thousand names distributed over 36 provinces. To all those replying to this circular of inquiry we have distributed seeds, and to very many others who have made special application or who have made personal requests; 18,250 packages, including 134 varieties of field and garden seeds, have thus been distributed to 730 individuals. Nearly all of these have been put up by employees in the office, and, before being sent out, labels giving brief instructions as to planting, printed in English and Spanish, were pasted upon each package. In a few cases large amounts of seeds have been distributed to individuals who are specially engaged in experimental work, and those are not included in the above enumeration. To all those to whom seeds have been sent there was also sent a circular giving general directions in regard to the preparation of the soil and subsequent care of the crops. A circular letter was also sent calling attention to the fact that the seeds were distributed with the understanding that an effort should be made to grow them, and a report of the results sent to the bureau of agriculture. A blank on which to make this report, with a return envelope, was in each case sent to the party to whom the seeds had been addressed. It is too early at this time to expect reports, but our correspondence indicates that there has been much interest taken in this work, and the effort of the bureau in supplying American vegetables is evidently appreciated. The records in the office show to whom seeds have been sent, giving the varieties and the amount in each case. There is also a record kept of each of the varieties of seeds handled and the parties to whom they have been sent. By the system adopted one can ascertain in a moment the quantity and variety of seeds sent to any individual, or the number of individuals to whom any given variety has been distributed and their addresses. Requests for seeds are continually coming in, and these are honored as far as possible.

It is hoped that, from the many distributions which have been made and from the reports that may be received therefrom, this bureau will secure much valuable information as to the particular fitness or otherwise of certain varieties over a wide area of territory. Attention is now being directed to securing seeds of the economic plants of the islands for experimental cultivation and further propagation. Steps are being taken to introduce from the United States and other countries small orchard fruits likely to succeed here. Attempts will be made to cultivate the various fruits of temperate climates in the more elevated regions, especially in the province of Benguet, which appears to be admirably suited for experiments of this nature.

The recent discovery by this bureau of what appears to be a native and undescribed species of grape in the island of Negros suggests the possibility of a line of fruit-growing in these islands which appears never yet to have been attempted—a wild grape whose resistance to humidity and heat, whose great productiveness and robust habit, as shown by the wild grape at Negros, may prove of inestimable value for the ultimate development of a race of grapes adapted to these regions, suitable either for the table or for the manufacture of wine.

With the exception of the mango, the fruits of this region have been pratically wholly neglected. Such tropical fruits as bananas and pineapples, and the extratropical citrus fruits which, together, practically make up the world's supply of commercial tropical fruit products, are totally undeveloped in these islands. The conditions of the soil and climate here are so generally adapted to the growth of bananas and pineapples and, in a few selected localities, the conditions are so well adapted to the growth of oranges and other citrus fruits, that the rapid development and large production of these most valuable crops are matters fairly beyond the experimental stage, requiring nothing more than the importation of selected varieties in sufficient quantities for their rapid propagation and wide dissemination. (See Exhibit A.)

As a part of the work in seed and plant introduction it is imperatively necessary, in order to avoid frequent loss of living plants, and of those whose seeds do not possess much vitality, that a small tract of land, closely accessible to the bureau, be secured, where immediate care can be given to the more perishable things and where experiments can be conducted with new and untried seeds, under the immediate supervision of the experts in the bureau.

BOTANICAL INVESTIGATIONS.

Since the organization of the bureau the work of the botanist, Mr. Elmer D. Merrill, has been chiefly directed to the collecting and preservation of native plants found in the vicinity of Manila and in central and northern Luzon. Whenever possible, sufficient material of each species has been secured for making exchanges with botanical institutions of other countries, and for sending to various European and American specialists where critical identifications are necessary. One set of specimens, numbering nearly four hundred species, is now being mounted for the herbarium of the bureau. The botanist has made one excursion through the provinces of central and northern Luzon to Aparri, and on this trip special attention was given to the general character of the country, its agricultural products and possibilities, and a report on these observations has already been presented. It was found that there are large tracts of excellent grazing lands in central Luzon, capable of supporting vast herds of cattle. The grasses covering these lands are fine in texture and apparently quite equal to the best meadow grasses of the United States.

Considerable time has been spent in compiling information relative to the work done upon the flora of the islands by the Spaniards and by botanists and collectors of other nationalities who have worked in the islands. The great mass of unidentified material accumulated by the forestry bureau during the past two years, consisting of from four to five thousand specimens, has all been carefully gone over, and the specimens relabeled and arranged to sets in papers of the standard herbarium size. Among these a sufficient number of unidentified tree species were represented to warrant the sending of the botanist to the botanical garden at Buitenzorg, Java, for the purpose of identifying them by comparison with named material which is to be found there. It is very unfortunate, both for the forestry bureau and the bureau of agriculture, where so many lines of work depend upon an exact knowledge of the various species of plants, that the large Spanish collections determined by Señor Vidal with the collaboration of Mr. Rolfe, of the Kew Gardens, together with a fine reference library, were entirely destroyed by fire in 1897, entailing a loss amounting to several hundred thousand dollars.

In the colonial possessions of England and Holland the fact that an accurate knowledge of the flora of the country is the first essential for future successful agricultural and forestry work was realized in the beginning and, consequently, we find in Java, Hongkong, Singapore, Penang, Ceylon, and India long established botanical gardens, each with magnificent collections of growing plants, both native and foreign, large herbaria and complete botanical libraries. In all these institutions the primary object has been to study and classify the flora of the several colonies and, secondly, to inquire into the economic agricultural forestry problems. The primary work has been accomplished and now these institutions, thus thoroughly grounded, are working largely on economic questions pertaining to agricultural and timber industries. In the Philippine Islands this same principle finally came to be recognized, but not until after several hundred years of occupation. The Spaniards had, however, done much toward developing a botanical knowledge of the plants of the archipelago, but the invaluable collections and hardly less valuable library were, as already stated, destroyed by fire prior to American occupation, causing a loss which will take years to replace. If, on arriving here, a well-equipped herbarium and library had been found, it would have been a matter of but a short time before the botanist's attention could have been turned to economic agricultural and forestry problems.

Ultimate success in these lines depends upon the establishment of a suitably located botanical garden, the building up of a new Philippine herbarium, and the acquiring of a complete botanical library. A botanical garden in the Philippines is a matter of such great importance to the agricultural interests of the islands that the chief of the bureau has had members of his staff who have had some experience in such matters prepare papers covering the subject, setting forth plans and suggestions for undertaking the establishment of such a garden here. The difficulty so far has been the selection of a suitable location, accessible to some center of population.

A thorough and scientific knowledge of the plants of the islands is the basis on which we must build our future economic work on timber, fiber plants, fruits, medicinal plants, food plants, and those that produce dyes, tans, gums, resins, gutta-percha, etc., and, in view of this, the botanical work should receive liberal support. (See Exhibit 6.)

SOIL INVESTIGATIONS.

The soil physicist, Mr. Clarence W. Dorsey, reached Manila during the latter part of May and, as soon as practicable, undertook the making of a preliminary survey of the abacá soils or the soils of the principal regions supplying Manila hemp. A thorough examination of these soils has been made with especial reference to their fertility, drainage conditions, origin, and suitability for other crops as well as abacá, to determine those best adapted to growing the finer qualities of abacá and, by a study of the physiographic conditions of the country as well as the climatic conditions, to determine to what extent these conditions influence the successful cultivation of hemp.

The principal abacá regions in southern Luzon have been visited by Mr. Dorsey, including the provinces of Camarines Sur, Albay, and Sorsogon, and observations were extended to northeastern Leyte and western Samar, in the neighborhood of Catbalogan. Representative samples of the soils and subsoils were collected, and the labor and market conditions in each locality were studied to some extent.

The question of the further extension of the hemp industry of the islands has been constantly kept in mind, and all information having any bearing upon this subject has been collected. Sufficient data has been gathered as a result of these investigations to enable the bureau to make recommendations in regard to suitable soils and locations and methods of cultivation of abacá to those wishing to engage in the hemp industry. A complete report on the observations thus far made relative to hemp soils is presented in Exhibit W.

In regard to the further extension of the soil work, the best results will accrue from carefully made surveys of certain selected areas. The soils of any given area must be classified according to their general physical conditions, and the distribution of the various classes shown on carefully prepared maps. These maps should be prepared on a sufficiently large scale to show all essential details, and they should be accompanied by descriptions of the various soil types.

The soil work involves a study of the geographical and physiographic features of the country and the climate, the present conditions of agriculture, the agricultural development of the region, special crops, and recommendations for the introduction of new crops. To do this work it is necessary to traverse the entire region under investigation and to gather all possible information in regard to its possibilities and resources. This work can be carried on at the rate of from four to six square miles per day, so that within a period of two months a field party of two men can plat an area of about 250 square miles.

This class of work has only recently been introduced in the United States, where it has met with great favor, and there can be no doubt of the success of such work here, where conditions are so little known and the great natural resources of the islands so imperfectly understood. The bureau of soils in the United States Department of Agriculture has now in its employ more than 100 men, 60 of whom are engaged in field work the greater part of the year.

Soil investigations of like nature are being carried on at the present time in northern Germany, in Russia, and in Japan.

The soil physicist has visited the government farm at Magalang, Pampanga Province, and also the experiment station at Albay, and his reports regarding the soil conditions of these two places have been submitted and are presented herewith. (Exhibits G and W.)

FIBER INVESTIGATIONS.

The fiber industry is at the present time the most important of the agricultural industries of the Philippines. On July 1, 1902, Mr. John W. Gilmore was appointed to take charge of the fiber investigations for this bureau. Work was at once begun by ascertaining what fibers and fibrous products were exported from the islands and the comparative value of these exports in relation to the exports of other products. At the same time investigations were undertaken to determine the economic fiber plants of the islands, their local or possible commercial value, geographic distribution, etc.

Only two fibers at the present time are subjects of export. These are Manila hemp and maguey. The amount of maguey exported is insignificant, but the value of the hemp exported equals 62½ per cent of the total exports of the islands.

The more important of the 52 fiber plants, either native or cultivated, are Manila hemp, maguey, cotton, ramie, pangdan, burri, nipa, and rattan, and these are treated quite fully in a paper which has been prepared by Mr. Gilmore for publication as a bulletin, entitled "Preliminary report on the commercial fibers of the Philippines." A Spanish translation is now being made of this paper, which is to serve as an introduction to later and more exhaustive reports, embodying both scientific and general information upon our fiber plants and their products.

The bureau has received eleven samples of commercially graded Manila hemp and three samples of maguey from Messrs. Smith, Bell & Co., of Manila, a number of samples from the island of Masbate through Mr. George Lander, provincial supervisor, and 32 small samples of fibers and fibrous products from all parts of the world, from the Philadelphia Commercial Museum.

A circular letter calling attention to the work of fiber investigations and its importance has been prepared, to be sent out with a circular of inquiry relative to fiber plants, their cultivation, distribution, conditions, and processes of production, etc. It is hoped by this means to secure much valuable information regarding the distribution of fiber-producing plants and fiber industries of the islands. Fiber plants yet unknown, or of unknown value, may be discovered by this means.

It is hoped that in the near future suitable grounds or gardens may be secured for growing various fiber plants, where they may be studied and experiments made in extracting their fibers.

WORK IN BATANGAS PROVINCE.

Through the urgent request of Gen. J. Franklin Bell, this bureau has undertaken to assist in conducting practical work in Batangas Province, the land, transportation, necessary teams, and labor for carrying on the work being furnished by General Bell through arrangements made with his superiors. The object is to demonstrate the practicability of using here American machinery, which has been supplied by this bureau, the growing of forage plants, such as alfalfa and teosinte, and certain other staple crops, such as cotton, tobacco, sugar cane, etc., according to American systems. The primary object, however, of the undertaking is to bring the work directly before the people, and to illustrate, by practical tests, the use of American farming implements and modern methods of growing and handling crops. This work has been placed in the immediate charge of Mr. Wilfred J. Boudreau, an employee of this bureau, who has a large experience in growing cotton, sugar cane, corn, and other crops of the more southern of the United States. The opportunities for carrying on this work in Batangas, in cooperation with the Army, are especially favorable to the plans of this bureau in introducing improved agricultural methods, and the results can not fail to be most valuable and far-reaching. There is probably no province in the islands where more diversified agriculture has been carried on, or where these experiments would be more appreciated, or where successful operations would be more quickly adopted and put into general practice, and General Bell deserves great credit for his efforts to bring these lessons before the people. Without his aid this bureau could not have undertaken the work at this time.

PUBLICATIONS.

This bureau has issued one circular of information, referred to under "Seed distribution," and one farmer's bulletin entitled, A Primer on the Cultivation of Sugar Cane. This bulletin was published both in Spanish and English, and has been generally well received. It has been reproduced in local papers in Manila and Iloilo. Reference has already been made to several papers now on hand, ready for publication. The most important of these papers are, A Preliminary Report on Fiber Plants, Abacá Soils, presented herewith as a part of this report (Exhibit W), and Modern Methods in Rice Culture, the last by Mr. W. J. Boudreau.

Circular of inquiry No. 2, issued in both Spanish and English early in the season, and referred to under "Seed distribution," has brought to this office a large amount of valuable information relative to the agricultural resources and conditions throughout the islands (Exhibit Z). Some of the returns have been very full and of unusual interest. About two hundred replies from thirty-six provinces have been received so far. Most of the replies are in Spanish, and the translation of these has involved considerable time and labor. The information thus acquired will be used in a future publication on the general agricultural resources of the islands.

Circular of inquiry No. 3, issued recently for the purpose of securing information relative to the fiber plants and fiber industries, is eliciting replies of much interest and value (Exhibit Z).

SAN RAMÓN FARM.

San Ramón farm is located about 16 kilometers northwest from Zamboanga, in Mindanao, and contains 2,200 hectares. Mr. Lyon, of this bureau, has recently visited the farm, and reports (Exhibit J) that all of it is susceptible of easy reduction to cultivation. The land is of exceptional fertility, and possesses good natural drainage and an assured fitness for corn, cotton, cane, cacao, cocoanuts, abacá, and all crops belonging to this latitude. Nearly the entire farm can be irrigated if desired, from water from a branch of the river Sax, which furnishes at all seasons of the year an inexhaustible supply, and the river could be used as well for furnishing power for an extensive milling, grinding, or sawing plant. At the present time, the area under cultivation does not exceed 50 hectares; nor is there any evidence that during the Spanish administration was there more than 150 hectares actually cultivated. Mr. George M. Havice was made manager of this farm by appointment, and took direct charge of the place on December 20, 1901. At that time the cocoanut groves and abacá fields, as well as the farm generally, were in a deplorable condition, due to a long period of neglect. Mr. Havice at once set to work to clear the land of the weeds and underbrush with which the place had become overgrown and, at the itme of Mr. Lyon's visit during the latter part of July, the cultivated area had been put in most excellent condition. There are now 8,731 cocoanut trees on the place, ranging in age from two months to fifty years, and 572 are in bearing. Thirty thousand plants of Manila hemp have been set out this season, and there are now 35 acres in abacá. There are over a thousand cacao trees, but Mr. Havice reports that every plant in the entire orchard has been stung by an insect which destroys the beans, and the crop this season, on that account, has been rendered valueless. Under the Spanish management there were between 300 and 400 acres of sugar cane on the place, but as yet nothing has been done with this, owing to special work required on other parts of the land. Formerly there was a large area in rice, but this land is now covered with a rank growth of grass. Some trouble has been experienced in securing necessary farm laborers, partly owing to the demand of the military government, which allows shorter hours and gives better pay, and partly because of the fact that the average Filipino will not work more than three days out of seven. The class of labor secured, however, is improving, and in the course of time better conditions may prevail.

There is no doubt whatever as to the great value of San Ramon farm as a means of demonstrating, by the growth of staple crops of this latitude, the income-producing power of lands in these islands. The report of Mr. Havice, manager of the farm, is presented herewith. (Exhibit K.)

LA GRANJA MODELA.

The government farm, La Granja Modela, near La Carlota, Western Negros, contains about 775 hectares. Nothing has yet been done with this farm by the bureau of agriculture, owing to the fact that there was some probability of its being taken by the department of public instruction, with the view of establishing upon it an agricultural college. The land has been cared for, however, by Señor Juan Araneta, who was superintendent of the place under the Spanish régime. Mr. W. S. Lyon, tropical agriculturist for this office, has recently visited La Granja, and in his report he says:

"The selection of La Carlota as the site for a model farm was one that reflects profound credit upon the original locators. It not only embraces a greater diversity of soils than is common in that part of Negros, but comprises large tracts of arable lands at altitudes ranging from 300 to 500 meters above sea level and is, therefore, well adapted to the testing of a great variety of agricultural products. Aside from these essential features, it embodies in the highest degree one needful qualification, and that is, it is located at the focal point from which radiate for many miles, north and south and west, the largest agricultural industries in the island, if not in the whole archipelago. The region about La Carlota is closely populated with a large number of both small and large planters, who are progressive and anxious to acquire a knowledge of the most improved and modern agricultural systems in vogue, and are public spirited enough to contribute the necessary lands to provide a station site in the vicinity in the event that La Granja be deemed unfitted for the use of the bureau. No valid objection can, however, be maintained against the present location, and in view of the realty and other improvements now upon the property, its reoccupation is to be advocated in preference to any other in that region. I consider that the abandonment of this station to any other uses than that of a Governmont model farm would be a retrograde slip that will reflect unhappily upon the early advancement of the best agricultural interests of these islands."

La Granja, with the property thereon, including five carabaos, is now under the charge of a caretaker, who is not officially employed by this bureau. It is earnestly recommended and urged that an experienced man be placed in charge of the farm at the earliest possible date, as further delay will only increase the expense of its renovation.

LA GRANJA MODELA DE LUZON.

The farm known to the Spaniards as La Granja Modela de Luzon, and to the Americans as the government farm at Magalang, is located in the province of Pampanga, near the village of Magalang, about 8 miles from Angeles, an important town on the Manila and Dagupan Railroad. It lies at the foot of Mount Arayat, and contains 1,050 hectares. Since the American occupation the farm was used for a time by the military government as a station for worn-out or diseased horses, but the place has for some months been abandoned by the military authorities, and nothing has since been done upon it. A considerable area of the farm was once in rice, and the Spaniards attempted to grow sugar cane upon the place, but were unsuccessful.

Several members of the bureau staff have visited the farm, with the view of determining its value for the uses of this bureau, and, although all have reported that the location was an exceedingly beautiful one and while the variety of soils on the place would permit a wide range of crops, the general character of the land is inferior and would involve a great deal of labor and expense to be put into first-class condition. (See Exhibit G.) Certain areas might be used for growing vegetables and truck crops which mature in a short time, but, for the most part, the soil is underlain by an impervious subsoil, and all the land would require the use of fertilizers.

For the purpose of using the farm as a botanic garden and trial grounds its inaccessibility to Manila is the chief objection. For the purpose of a general experiment farm it is not desirable because of the soil conditions, the land being of inferior quality and poorly drained.

The possibility of securing a better farm than that near Magalang has been considered. There are one or two points between Manila and Angeles which apparently offer better conditions. One of these is near Malolos, the other south of Calumpit. As seen from the train, the soil near the latter place appears to be a well-drained, fertile loam, several feet in depth. It is evidently very rich, easily cultivated, and well adapted for sugar cane and forage crops. In regard to points beyond Angeles, prominent Filipinos at Magalang, who have been consulted in the matter, strongly recommend a tract of land between the stations of Capas Murcia and Tarlac, in the province of Tarlac. All unite in saying that there are to be found rich soils, with varying surface conditions, such as rolling foothills, valley lands, and even virgin forest land, all within a small district, and admirably adapted for the purpose of an experimental farm, that might be established, and which would prove of great benefit to the people of the neighboring provinces.

The province of Bantangas was noted at one time as being the richest in the islands. Its live stock interests were very important, and the superior excellence of its horses was widely recognized; but the chief source of its wealth was coffee. One of the chief exports from Bantangas to-day is oranges. Abacá, cacao, and cotton, as well as corn, sugar cane, and lowland and upland rice, all grow in the province. It is a province having lands of great fertility, and it would be difficult to find in the islands a location where all the conditions would be more favorable for the establishment of a great model farm for conducting all lines of agricultural work, including general farming, horticulture, and the raising of live stock, than in the vicinity of the towns of Lipa or Batangas.

EXPERIMENTS AT BAGUIO.

Early in June Mr. Thomas Hanley, expert in plant culture in the bureau, was sent to Benguet, under instructions to begin experiments there in the cultivation of American vegetables, to study the location for the purpose of determining the advisability of establishing at Baguio an experimental station for the growing of extra tropical crops and if the local conditions justified the consideration of the place as being suitable for the establishment of a botanical garden. Mr. Hanley has presented a very full report upon the results of his observations and the work done by him while there (Exhibit U). In his report he says, in referring to the scenery:

"Its characteristic feature is a pleasing softness of outline, brought about largely by the vegetation that clothes its surface, and this, with its diversity of views, its cool breezes, laden with the odor of 'murmuring pines,' its springs and streams, probably accounts for the soothing beneficial effects it has upon the beholder. There could be no more suitable place for a sanitarium, and its selection for the purpose is a most wise one. * * * The soil on the slopes and hills is composed of a red volcanic clay loam of great depth. * * * There was something familiar to me about this red soil, as well as the surrounding hills and valleys. They suggested the soil and the scenery of a place called Mount Gambier, in South Australia, seen by the writer many years ago. The soil there, as here, is of volcanic origin, and in the early days of occupation in that colony the fertility of the red-clay soil escaped notice. Some one, however, started cultivation and the result was surprising. Like Benguet, the climate there is quite different from that of the lowland country. Potatoes can not be grown in the hot plains of Australia. They were tried here (Mount Gambier) and the yield was enormous. It was the same with onions. In a short time there was a rush for land, and what could be obtained for $10 an acre previously, quickly brought $150. Mount Gambier in a couple of years became famous for its wonderful crops, and since then has shipped its products to all parts of the country. The only difference I can see in the soil here (at Benguet) is that it is more tenacious in character, but not sufficiently so to prevent ready drainage."

Some of the advantages of the location are a climate which will permit the growing of a great variety of plants, tropical, subtropical, and those from the Temperate Zone; natural advantages in the way of landscape, and an abundant water supply.

In the gardens of the governor of the province one sees healthy coffee trees loaded with berries, vigorous growing tea plants, hot-house gardenia, caladiums, dracænas, frangi pani, and mango trees, all plants of the Tropics; alsophila tree ferns, scarlet hibiscus, passion fruit, begonias, hydrangeas, and many others of the subtropical regions, while near by are potatoes and other garden vegetables, monthly roses and pines, strictly plants of the Temperate Zone. Probably in no other part of the world could there be grown side by side the gorgeous vegetation of the Tropics and the pines of temperate regions, orchards of coffee, celery, and Irish potatoes.

Nearly all the plants of the Tropics, prized either as ornaments or for their economic products, could be grown here. Any selection of extra tropical plants as well as most of those of the temperate regions could surely be grown with success; while if the grounds were properly laid out and carefully looked after, with the interesting and valuable flora of the archipelago made a special feature, Baguio might become the leading botanical garden of the world. Mr. Hanley states that:

"In view of the wonderful natural advantages of the place in the way of soil and climate, too much could not be done by the bureau to develop its resources, and if this course is pursued, I anticipate that in a few years Baguio will become the garden of the islands, supplying all those agricultural products which can not profitably be raised elsewhere in the archipelago."

The present inaccessibility of the place is certain to be overcome in the near future, when objections to the location on that account will no longer exist. No work can be begun, however, before some definite plan of operations is worked out and the area of the land to be occupied definitely agreed upon. If the plan of establishing a garden and experiment station at Baguio is approved, the working plan outlined in Mr. Hanley's report may in the main be adopted. In a letter from Baguio, dated July 18, Mr. Hanley writes:

"As a rule a place where there is great natural beauty does not offer much scope for farming, but Baguio seems to combine both, and when my work here shall bring convincing proof on the latter point, I hope the Professor will open here an experimental farm, which from an agricultural point of view will produce great results, and be a retreat for a time for those of us who may break down in the discharge of duty elsewhere."

And again he writes:

"There are two reasons why I advise such a course (the establishment of an experiment station at Baguio): First, it would be a commercial success; and, second, it would be a means of enlightening those residing in this part of the country by showing them the most remunerative line of cultivation to follow where now absolutely nothing is known and agriculture is as a sealed book."

In commencing experimental work at Baguio, ground on a hillside was selected for cropping in the rainy season. The land was terraced by the Igorrotes, who are experts in this work. The soil is a mixture of "red clay" and black, peaty loam.

The following seeds were sown in a "nursery" on July 8, 1902: Cabbage, 3 varieties; tomatoes, 3 varieties; onions, 3 varieties; leek, 1 variety.

On July 13 there were sown in beds the following: Carrot; turnip; parsnip; beans, 3 varieties; peas, 3 varieties; onions, 2 varieties; cucumbers, 3 varieties; marrow, 1 variety; squash, 1 variety; pumpkin, 1 variety, and salsify, 1 variety.

On July 18 Irish potatoes were planted, an inferior variety grown by Igorrotes, and very small.

On July 9 small trial plots were sown to the following: White oats, 2 varieties of wheat, pearl millet, beans, peas, alfalfa, squash. All these germinated quickly, and on July 22 there was nothing to show in any way that the soil is injurious or deficient in plant food.

Already (July 23) these experiments have given most valuable information about climatic conditions, which will be invaluable when brought to bear upon future work.

ANIMAL INDUSTRY.

There is at this time nothing so seriously affecting the agricultural condition of the islands as the lack of draft animals, and appeals have been made to the bureau from many quarters urging the necessity of taking some action to improve the animal industries of the islands. There are some sections where farm work has been entirely abandoned through the loss from disease of the native draft animals and the utter impossibility of replacing them. The bureau of government laboratories is doing all within its power to check the ravages of disease among cattle and horses, and it falls within the province of this bureau to improve the existing breeds of domestic animals by careful selection or by the introduction of improved animals from other countries. As soon as the work can safely be commenced, improved strains of

Indian cattle and a selected breed of carabao will be introduced, and steps have already been taken looking toward the improvement of native horses by the use of thoroughbred animals. This work is being delayed at the present time, awaiting the appointment of a skilled expert in animal industry, who will be appointed as soon as the services of the right man can be secured.

Respectfully,

F. Lamson-Scribner,
Chief of Bureau.

Exhibit A.

REPORT OF WILLIAM S. LYON, IN CHARGE OF SEED AND PLANT INTRODUCTION.

Manila, P. I., September 1, 1902.

Sir: I have the honor to present herewith an abstract of the work of that division of the bureau which has in charge the introduction and dissemination of seeds and plants whose cultivation in this archipelago it may be reasonably expected will diversify, enlarge, and better the agricultural resources and industries of the islands.

As an initial step in this direction a large assortment of approved varieties of garden and field seeds was brought to Manila at the time the bureau was organized, and correspondence at once undertaken to place the office in touch with planters, and to ascertain the requirements and necessities of the different provinces.

This correspondence announced the fact that the bureau had these seeds for general distribution to those farmers who would plant and care for them and finally report to this office (upon a blank specially provided) the results obtained.

By this means it was expected that within a brief time the bureau would secure much information as to the particular fitness or otherwise of certain varieties over a widespread area, much of it not readily accessible, and the accurate determination of whose special qualifications to special crops by the trained agents of this bureau would necessarily be a matter involving years of patient elaboration.

In the purchase and selection of its own seeds we were of necessity guided by the general conditions existing in tropical countries, and not by an exact knowledge of such as were especially suited to this region, and it is yet too early to forecast the results of the venture.

In addition to this, there were brought here a large number (nearly 50,000) seed packets, put up for distribution and presented to this bureau by the United States Department of Agriculture. These consisted entirely of garden seeds of approved standard kinds, and as the seed was of good germinative quality it is confidently hoped that a fair measure of success may follow, to the end of promoting among the farmers of the islands a demand for the finer grades of American and European kitchen garden vegetables.

It is an indisputable fact that seeds of all kinds, and especially those of an oily nature, deteriorate rapidly in any climate analogous to ours, and it is an equally important fact that many species of temperate origin degenerate with like rapidity, and the difficulty of maintaining a fair standard of quality for more than one year has doubtless had much to do with the general apathy that has heretofore characterized the perfunctory and spasmodic planting of garden seeds by the planters of these islands.

It is hoped that from the many distributions that have been made, from the reports that may be received therefrom, from personal observations, and from a careful record of our own tests, it will be entirely feasible to breed a strain of many desirable vegetables of temperate origin, the maintenance of whose best features and the perfecting of whose seed may be effected with reasonable certainty and dispatch.

Until that time the annual importation of foreign-grown strains of seeds would seem to be unavoidable, if the interest is to be sustained in the improvement of horticultural and agricultural conditions that this bureau in so brief a time as four months has succeeded in arousing.

Very considerable distributions have also been made of the best varieties of cotton, corn, alfalfa, millet, and other staple field crops adapted to tropical regions, and the energies of this office are now strongly concentrated upon accurately determining the best portions of the archipelago where the planting of these crops may be advantageously prosecuted upon a large commercial scale.

Of the leading agricultural products of these islands there are but two—abacá and copra—that are in a wholly flourishing condition, and where net returns to the average planter are large and satisfactory. That very radical and gainful methods of growing, handling, and producing are yet to be adopted, does not admit of controversy, but at the present moment the condition of these two industries is such that they may be temporarily dismissed from consideration by this office in behalf of others whose condition seems to command the most urgent efforts of this bureau for their betterment. These crops are sugar and rice. The former of these industries is in a lamentable condition, many planters maintaining their plantings at a loss, others simply abandoning much excellent cane in the fields. In many of the northern and extreme southern portions of the islands very imperfect and primitive methods of cultivation are in vogue in the cane fields, nor are the seed varieties the best procurable.

A small beginning has been made by this office in the publication and distribution of a bulletin treating improved methods of cane growing, and as an auxiliary relief measure has in hand a lot of the best known seed canes, whose propagation and distribution to the planters of the islands will be prosecuted with all the dispatch possible.

Nevertheless, there are regions, notably in western Negros, which is accredited with the production of nearly three-fourths of all the sugar raised in these islands, where cane growing is conducted upon correct lines and in close conformity with the most approved systems. In this region there is, nevertheless, the stagnation prevalent in other portions of the islands and, after visiting nearly a score of large and small estates, it is quite evident that the most active agents in causing this depression are:

First. The lack of modern and effective mills, capable of extracting more than 75 per cent of the sugar.

Second. The execrable roads that enhance the cost of transportation to tidewater.

Third. Carriage of the crude sugar and loss of the by-products to the mill operator.

The only relief that suggests itself lies in the erection of one or more large central sugar plants for the production at least of good grades of sugars, and it lies within our province so to present the circumstances of soil, climate, areas in cultivation, labor conditions, and product as to interest outside capital in an enterprise that, more than any other, will overcome the present regrettable conditions.

I suggest, as a legitimate and expeditious way whereby the interest and cooperation of investors may be invited to this subject, that an elaborate collection of the canes, crude sugars, and soils of the sugar districts of western Negros be made, and that a special effort be made to secure a prominent place for the same as an exhibit at the world's fair at St. Louis, and that it be accompanied with a pamphlet for distribution, setting forth the exact conditions and redeeming it from any suspicion of advertising by the official approval and indorsement of this bureau as to the facts therein set forth. Incidentally such a collection, without much additional cost, could be made in duplicate for permanent exhibition in the museum, chamber of commerce, or at some other point in Manila, where it would be readily accessible to visitors.

The condition of the rice industry, our other great staple, is one commanding quite as urgent attention from this bureau. The ravages of war and the loss of a vast number of farm animals will satisfactorily account for the present annual deficiency of more than 4,000,000 pesos in the amount required for home consumption, but are wholly inadequate to explain away the fact that, with unrivaled facilities for the production of a vast surplus, these islands have never been exporters of rice. This office has made close inquiry into the methods followed by the native planters, and has endeavored to improve the situation by the introduction of some new and productive varieties of seed rice; but the root of the evil lies chiefly in the methods of cultivation followed, and with the present difficulties arising from the loss of draft animals it becomes a serious problem and one demanding immediate attention and active efforts to discover some practical solution.

From an economic view point, from the fact that rice is the staple food of nine-tenths of the inhabitants of these islands, the fullest development of the industry of its production acquires a significance that quite overshadows the importance of any product grown wholly for export.

It is the profound importance of this subject that prompts me to lay especial stress upon an investigation of the various methods now in vogue in the Orient in rice culture, and especially of the methods which permit of its production in French Tonquin in sufficient quantities to provide for the wants of its dense population, and to permit as well of an annual exportation valued at $18,000,000 gold. The agricultural exposition to be held in Hanoi in November next will offer excellent facilities for the observation of their rice products and ready and inexpensive means of reaching the points where these rice cultivations (many under trained French experts) are being operated, and I suggest that a representative of this bureau be selected to visit the exposition to make these desired investigations.

This division has only effected introductory work in the many minor branches of tropical agriculture that have come before its consideration. It has explored portions of Mindanao, Basilan, Negros, Panay, and western and central Luzon, to determine the adaptation and requirements of different localities to such varied tropical cultures as copra, abacá, cacao, coffee, cotton, gutta, dye woods, vanilla, and many spices whose harvest and preparation for market could largely be performed by child labor.

Incidental thereto there have been collected seeds peculiar to these islands, and which, as a medium of exchange, will enable the office to secure the introduction of valuable economic plants not easily procurable through ordinary commercial channels.

I have the further pleasure to report the discovery, upon Negros, of what I believe to be an undescribed species of vitis, a wild grape, whose resistance to humidity and heat, great productiveness and robust habit, indicate that it will be of inestimable value for the ultimate elaboration of a race adapted to these regions and to wine manufacture.

With the single exception of the mango, the fruits of this region have been completely neglected. In the former I am well assured, in many instances, careful seed selection has been followed for generations, and the unchallenged claim that the archipelago produces the finest fruits in the world is probably largely due to this incident.

The two other tropical fruits, bananas and pineapples, as well as the extra tropical citrus fruits that, together, practically make up the world's supply of commercial tropical fruit products, are totally undeveloped in these islands; and the conditions of soil and climate are generally so universally adapted to the two former, and in some select localities to the latter, that the rapid betterment and large production of these invaluable crops is a matter fairly beyond the experimental stage, and requires nothing more than the importation of select varieties in sufficient quantities for their rapid propagation and dissemination throughout the islands.

This office is now negotiating for collections of these and has likewise in transit and at hand seed and plants of many valuable economic products without available grounds for their growth and multiplication. Such grounds should be near at hand. Both plants and seeds often arrive here in a critical condition and require immediate care and planting. Reshipment to the distant points where the bureau has lands and labor at its disposal, and the long delay incident thereto, would assuredly result in the loss of these articles; and I urgently recommend, as the most needful thing to place this division upon a footing of practical utility, the acquisition of a small tract of land closely accessible to this office and from whence the care and multiplication of these subjects may be intelligently and successfully overseen.

It was not until July of this year that the work in seed and plant introduction was equipped with the essentials for its seed distribution. Since that time seeds have been sent to 731 planters, who applied therefor, and most of whom have expressed lively gratitude for the opportunity afforded them to better the quantity and quality of their field and garden products.

In each case simple cultural directions, prepared in this office and printed in both English and Spanish, accompanied the issue of seeds.

From the accompanying table it will be seen that this distribution was composed of 26 sorts of garden vegetables, 11 grades of forage plants, and 10 staple field crops, covering a total of 134 standard varieties. A record is kept showing the quantity, number of varieties, and directions to whom sent, which will enable this division at any time to review its relations with the different beneficiaries of this work, and thereby maintain a close surveillance over its operations throughout the archipelago.

VARIETIES OF SEEDS DISTRIBUTED BY THE BUREAU OF AGRICULTURE JULY 1 TO SEPTEMBER 1, 1902.

	Varieties.		Varieties.
Alfalfa	1	Leek	2
Asparagus	2	Lettuce	3
Beans	14	Melon (musk)	4
Bermuda grass	1	Millet	1
Cabbage	5	Oats	2
Carrot	1	Okra	2
Celery	1	Onions	5
Clover	2	Parsnip	1
Corn (sweet)	4	Peas	10
Corn (field)	8	Pepper	4
Corn (kaffir)	1	Pumpkin	2
Cucumber	4	Peanuts	2
Cowpeas	1	Paspalum	1
Cotton	4	Phaseolus	1
Cracca vetch	2	Pisum	1
Department seeds, United States	4	Radish	1
Egg plant	3	Rice	1
Endive	2	Soja beans	1
Garlic	1	Salsify	1
Garbanzo	1	Squash	6
Gram	1	Sesame	2
Tobacco	5	Tomato	5
Teosinte	1	Turnip	1

In addition to these, the bureau has introduced seeds of many plants, chiefly through the United States Department of Agriculture, but not in sufficient quantity for general distribution. There are 3,319 packages in this lot, and in it there are seeds of many rare and valuable species—the best things of many countries gathered by the agricultural explorers of the Department of Agriculture at Washington.

Respectfully,

Wm. S. Lyon,
In Charge of Seed and Plant Introduction.

Prof. F. Lamson-Scribner,
Chief Insular Bureau of Agriculture, Manila, P. I.

Exhibit B.

REPORT OF THE BOTANIST.

Manila, P. I., *September 2, 1902.*

Sir: I have the honor to present the following report on the work accomplished by the botanical department since the organization of this bureau, together with suggestions regarding lines of work in the future.

The work accomplished has been done entirely since arriving in Manila on the 21st of April, 1902, and a fair start has been made in collecting material representing the flora of these islands.

About 2,400 specimens have been prepared, representing 380 numbers, consisting of plants growing in the vicinity of Manila and in central and northern Luzon. Whenever possible in collecting material, many duplicates have been prepared for distribution to botanical institutions in the United States and Europe, to send to various European and American specialists for critical identification, and for purposes of exchange with the several botanical gardens of neighboring countries, in order that we may obtain authentically named material from those countries which possess a flora similar to that of the Philippines, for such material will be of the greatest value in our work on identifications, range of species, etc. One set of this material is now being mounted for the herbarium, and much of it has been identified, while the labels for the duplicates have been completed, and shortly these latter will be arranged in sets for distribution and exchange.

Botanical explorations have been confined to the vicinity of Manila and one five weeks' trip through central Luzon to Aparri, material being collected in the provinces of Pangasinan, Nueva Ecija, Nueva Viscaya, Isabela, Cagayan, Ilocos Sur, and Zambales.

On this trip especial attention was given to the character of the country, its agricultural products and possibilities, and a report on the same has been presented to you, giving, among other information, a rather full account of the vast tracts of excellent grazing lands in central Luzon, their availability, topography, amount of forage and quality of the same, together with generic determinations of the prevailing native forage grasses and their adaptability to grazing purposes.

Information and data regarding Spanish botanical explorations in these islands have been compiled, and inquiry made into the work of botanists and collectors of other nationalities who have worked on the Philippine flora. Regarding the present distribution of Philippine botanical material, data have been secured concerning the collections represented at the Kew Gardens and British Museum, London, and at the botanical institutions of Berlin, Paris, and Madrid, in Europe; Gray Herbarium, New York Botanical Garden, United States National Herbarium, Philadelphia Academy of Natural Sciences, and the St. Louis Botanical Gardens, in the United States. Correspondence has been opened with most of the above institutions and with the botanical gardens at Hongkong, Singapore, Buitenzorg, Java, Peradeniya, Ceylon, and Calcutta regarding exchange of material, aid in identifications, etc.; also inquiry has been made of the director of the Kew Gardens in England regarding the arrangement made during the Spanish régime between Señor Vidal of the forestry bureau here and Mr. Rolfe of the Kew Gardens in the matter of aid in identifications, and to determine on what conditions we may secure the services of a collaborator at the Kew Gardens.

On July 20, 1902, by act of the Commission I was made botanist also to the bureau of forestry, and a few days later a great mass of unidentified material that had accumulated in the past two years was turned over to me for determination. This material, consisting of four or five thousand specimens, still loose in the papers in which they were prepared, represented collections made by various officials of the forestry bureau in the provinces of Camarines Sur, Albay, Bataan, Tarlac, Pampanga, and in Mindanao and Jolo. Many of the specimens were worthless for purposes of classification, while many others had been destroyed by insects. Since taking charge of the forestry bureau all my official time and many hours of extra time have been spent on this material, arranging it by collections, securing data, completing labels, renumbering the specimens, arranging in sets, preparing one set for the herbarium, one to take to Buitenzorg for identification, the remaining material being for general distribution and exchange. Work on this material has been completed, with the exception of identifications, which will be largely worked out at Buitenzorg.

For those lines of work in both forestry and agriculture which depend so much on our proper knowledge of the various species of plants, it was especially unfortunate that the large Spanish collections classified by Señor Vidal, with the collaboration of Mr. Rolfe of the Kew Gardens, together with a fine reference library, were entirely destroyed by fire in 1897, entailing a loss of several hundred thousand dollars.

In the colonial possessions of England and Holland the fact that an accurate knowledge of the flora of the country is the first essential for future successful agricultural and forestry work in the colony was realized in the beginning, and consequently we find in Java, in Hongkong, in Singapore, in Penang, in Ceylon, India, etc., long-established botanical gardens, each with its magnificent collection of growing plants, both native and foreign, large herbaria, and complete botanical libraries. In all these institutions the primary object was to study and classify the flora of the several colonies; secondly, to inquire into economic, agricultural, and forestry problems. In every case now these conditions are reversed; the flora of each region is known, and consequently these institutions are now working largely on economic, agricultural, and forestry problems.

In the Philippine Islands this same principle was recognized by the Spaniards, but not until after several hundred years of occupation. As a result, the present botanical gardens were established, unfortunately, however, in a very poor location for the purpose. Thorough botanical collections were made in these islands, much botanical material was secured from neighboring countries, a complete botanical library was established, Señor Vidal was made director of the work, and an excellent botanist was commissioned to visit England, Germany, France, and Spain to study the Philippine material in the botanical institutions of London, Berlin, Paris, and Madrid. He returned to Manila thoroughly equipped for the work, and issued several valuable publications and reports on botanical subjects relating to the flora of these islands. His publications are now available, but all the other work, data, collections, and books were destroyed by fire the year before the American occupation of these islands.

If the American agricultural and forestry administration in these islands is to succeed, both must be established on practically the same lines followed by the English and Dutch in their colonial possessions, although profiting by the experience of these pioneers, and under existing conditions in the Philippines, a judicial combination of the scientific and economic work will probably lead to the best results. If on arriving here a well-equipped herbarium and library had been found, it would have been a matter of but a short time before any properly equipped botanist would have turned his attention to economic, agricultural, and forestry problems. Without such, however, it is an absolute necessity for us to establish a botanical garden in a suitable location, to build up a new Philippine herbarium and establish a complete botanical library. With our present lack of equipment, no authentically named botanical material, and practically no botanical literature, unless proper aid in securing this material is given the best equipped botanist could not hope to succeed.

Whenever possible, the collections should be identified here, and they can be identified if we are given proper facilities. Identifications can be secured by sending material to various European specialists, but often the delay would be vexatious in the extreme; perhaps one might receive a report within five or six months, or perhaps not within a year, eighteen months, or two years. Still, in the case of large and critical genera, this is our only resource.

My present duties as botanist to the bureaus of agriculture and forestry comprise the collection and preparation of botanical specimens, identification of such material and that secured by others, the entire charge of establishing a new Philippine herbarium, distribution of duplicates, arranging for exchange of material with other botanical institutions, and, in addition to this very pressing systematic work, I am under instructions to inquire into the question of the forage supply of the city of Manila, and also the question of rice culture in these islands, covering present methods of cultivation, improvement of the same, introduction of new improved varieties, etc.

For the immediate use of the botanical department, six or eight thousand dollars are imperatively needed for books which are not obtainable in Manila, and none of which would duplicate those in the library of the forestry bureau or of the government laboratories. Additional clerical help is also essential, as at present most of my time is taken up with routine work, writing labels, arranging specimens for mounting and distribution, etc., time which should be employed in the more important matters of identification of material, looking up authorities and references, and determining the many yet unnamed plants of economic value. A position of curator should be created whose duty should be to attend to all the routine work of the herbarium and the protection of material against ravages of insects and moisture. Allowance should be made in the fund for contingent expenses of purchasing proper mounting and drying paper, glue, labels, suitable herbarium cases, etc.

The future policy of the botanical work will be largely dependent on local conditions. The essentials are thorough equipment for work in the matter of reference books, thorough botanical explorations and collection of material throughout the archipelago, and sufficient aid to carry on the work properly. A thorough scientific knowledge of the plants of the islands is the basis on which we must build our future economic work on the timber, fiber plants, fruits, medical plants, and those that produce dyes, tans, gums, resins, gutta-percha, etc., and accordingly the future policy of this bureau should be primarily to study and classify the plants of these islands, and, secondarily, to work out the economic botanical problems or, if sufficient aid is granted, to work out the economic problems in conjunction with the scientific problems.

Respectfully,

ELMER D. MERRILL,
Botanist.

Prof. F. LAMSON-SCRIBNER,
Chief, Insular Bureau of Agriculture, Manila, P. I.

EXHIBIT C.

REPORT OF THE SOIL PHYSICIST.

MANILA, P. I., *September 2, 1902.*

SIR: In compliance with the request of your letter of August 29, 1902, I have the honor to submit the following report of my work as soil physicist in this bureau from the date of my arrival in Manila, May 21, 1902, to September 1, 1902.

As soon as the proper arrangements could be made a preliminary examination was undertaken of the soils of the principal abaca-producing regions of the archipelago.

The object of this investigation was a thorough examination of the soils with especial reference to their fertility, drainage conditions, cultivation, origin, and suitability for other crops as well as abaca, to determine those soils which are best adapted to growing a fine quality of abaca, and to study the physiographic conditions of the country as well as the climatic conditions and to determine to what extent they influence the successful cultivation of abaca, or manila hemp.

The principal abaca regions in southern Luzon were visited, including a number of important localities in the provinces of Camarines Sur, Albay, and Sorsogon. The fine abaca region of northeastern Leyte was studied, and a rapid examination was made of western Samar in the neighborhood of Catbalogan. At each of these places representative samples of soils and subsoils were collected and much valuable information was gathered about the soil, and climatic and physiographic conditions of each region. The labor and market conditions were also studied to some extent in each locality. The subject of the further extension of the hemp industry of the islands was constantly in mind, and all information which could have a bearing on this question was collected. The complete results of these investigations, in suitable form for publication and distribution, will be submitted in a few days. Sufficient information was collected as a result of these examinations to enable this bureau to make recommendations in regard to suitable soils, locations, and methods of cultivation to those wishing to engage in the industry. Recommendations can also be made as to the further extension of the industry in other provinces than those now known as abaca-producing regions.

In addition to these investigations, an examination was made of the Government experiment farms at Magalang, Pampanga Province, and near Daraga, in Albay Province, as well as an examination of the soils of the new military reservation at San Pedro Macati. The results of the examination of the soils of the tracts of land and their suitability for the various purposes proposed by this bureau have been submitted in writing.

In regard to the further extension of soil work, it is believed the greatest good can be derived from the actual mapping or surveying the soils of certain selected areas in the archipelago. To map the soils of an area consists in classifying the soils according to their texture and general physical conditions, and showing the distribution of these various classes of soils on carefully prepared maps. The maps used for this purpose should be on a very large scale, preferably 1 inch to 1 mile, and should show the exact location of all roads and trails, cities, towns, and barrios, as well as the mountains, streams, etc. To accompany the soil maps, reports are prepared which fully describe the various soil types or classes. In addition to complete descriptions of the different soils found in the area surveyed are chapters which describe the geological and physiographic features of the country, the climate, the present condition of agriculture, the agricultural development of the region, special crops, and recommendations for the introduction of new crops. It is the intention, in making a soil survey, to reproduce the soil conditions by colored maps and to fully describe the agricultural conditions as they exist in the area. In no other way can such accurate and detailed information be made available in regard to any section of the country as by means of a soil survey. To do this work it is necessary to traverse the entire region, carefully examining the soil to determine its fertility and its suitability for the crops grown upon it, as well as for other crops, and classifying it into various types and showing the location of these on the maps. All possible information is collected in regard to the agricultural possibilities and resources of the region. This work can be carried on at the rate of from 4 to 6 square miles per day, so that, within a period of two months, one field party of two men can complete an area of about 250 square miles. This class of work has recently been introduced in the United States and has met with great favor there, so that there can be no doubt of the success of such work here, where conditions are so little known and agriculture so backward and the great natural resources of the islands so imperfectly understood. It may be mentioned in this connection that somewhat similar soil-survey work has been carried on in northern Germany, in Russia, and in Japan.

It is the intention to start this soil-survey work at once, as soon as an area can be selected. When one area is finished of sufficient size to show graphically the resources and character of the soils of the country, other areas can be selected and the soils mapped as fast as possible.

Respectfully,

Clarence W. Dorsey,
Soil Physicist.

Prof. F. Lamson-Scribner,
Chief Insular Bureau of Agriculture, Manila, P. I.

Exhibit D.

REPORT OF THE EXPERT IN FIBER INVESTIGATIONS.

Manila, P. I., *September 4, 1902.*

Sir: I have the honor to submit herewith the following statements as information bearing upon what has already been accomplished in the work of fiber investigations, and plans and recommendations for the successful conduct of the same.

I began the work of fiber investigations on July 1, 1902, and steps were immediately taken to ascertain what fibers and fibrous products were exported from the islands and their relation in quantity and value to other exports and to the total exports. At the same time, investigations were carried on to determine the economic fiber plants of the islands, their products and geographical distribution.

As a result of these investigations, it has been learned that at present only Manila hemp and maguey are exported, the former amounting to a value of $14,453,110, or 62 per cent of the total exports, but the latter only in very small quantities. It may be said in passing, too, that the production of Manila hemp seems to be capable of considerable improvement, both in quantity and quality, as the margin between the cost of production and the selling price is quite broad and the methods of production are primitive.

In regard to the economic fiber plants of the Philippines, 52 species have been noted, along with their geographical distribution, their products and the local uses. Of these Manila hemp, maguey, cotton, ramie, pangdan, burri, nipa, and rattan are at present the most important, and are receiving more or less commercial attention. These form the subject-matter of a paper entitled "A preliminary report on the commercial fibers of the Philippines," which is now in the hands of the translator to be translated into Spanish, for publication in both languages. It is intended that this report shall serve as an introduction to later reports more specific in character and embodying both scientific and general information upon fiber plants and their products.

During the two months since the establishment of the office of fiber investigations we have received 11 samples of Manila hemp, commercially graded, and 3 samples of maguey from Messrs. Smith, Bell & Co., of Manila. In addition to this we have received 8 samples of Manila hemp of varying length and quality, and 3 samples of hibiscus fiber from the island of Masbate; also 1 sample of Manila hemp, representing the amount taken from one plant, from Zamboanga, and 2 samples of pineapple fiber from Negros. Thirty-two small samples of fibers and fibrous products from all parts of the world have been received from the Philadelphia Commercial Museum. These samples are arranged for convenient inspection and will be used for comparison and study. It is intended from time to time to increase and broaden this collection until it shall include all fibers and fibrous products of the Philippines.

Many requests for information relative to fibers have been received and other correspondence has been carried on. A circular letter calling attention to the work of fiber investigations and its importance has been prepared to be sent out with a list of inquiries relative to fiber plants, their cultivation, distribution, conditions, and processes of production. This circular letter and list of inquiries are to be sent to fiber producers, farmers, and other citizens of the archipelago who can furnish reliable answers. By this means it is hoped to gain valuable information regarding the distribution of fiber-producing plants and the fiber industries, and also to become better acquainted with the fiber conditions and problems existing in the Philippines.

Some attention has also been given to the matter of books and papers on fibers for reference. More than 100 have been chosen which, when secured, will make a valuable addition to the bureau library.

The report on future plans may be prefaced by a general outline of the work of fiber investigations, as follows:

1. Correspond with fiber dealers and consumers for the purpose of introducing and promoting promising fibers. Consult fiber dealers in Manila and collect grades of fibers handled.
2. Plant and propagate, for purposes of study and experimentation, all fiber-producing plants.
3. Collect and describe all commercial fibers and articles or objects made from them.
4. Collect and describe all fibers not yet commercially known; establish the botanical relationships of both these and the preceding.
5. Make studies of the physical and chemical properties of fibers.
6. Investigate the conditions and possibilities for introducing fiber plants not already cultivated in the islands, such as cotton. flax, jute, hemp, and sisal.

7. Consult customs authorities relative to kinds and quantities of fibers exported and imported.
8. Investigate the leaf and bark materials used for mats, hats, bags, and other articles.
9. Investigate the genus Calamus (rattan) for new and useful species.
10. Compile and prepare for publication reports on these fiber plant investigations, presenting such reports as soon as sufficient material of public interest has been collected to make publication seem desirable.

In regard to these lines of work, I would respectfully call attention to the provisions and equipment necessary for successfully carrying them out. In order to economize time and labor in the study of fiber plants, it will not only be necessary to see them in their natural habitat and environment, but also to collect and propagate them in a central station where their characteristics and habits of growth can be compared and studied. For this purpose I would respectfully recommend that 20 acres be apportioned upon the central station which is to be selected. If this is not feasible, I would recommend that such smaller areas as would be necessary be set off upon the substations where the climatic and soil conditions are suitable for growing the plants. By either of these ways the study of the Philippine fiber plants will be facilitated, and means will be afforded for propagating and experimenting with such fiber plants as are not already extensively grown in the Philippines, but which seem worthy of introduction. In connection with these experiments and investigations, I would respectfully ask that a cotton gin and a machine for extracting maguey, along with suitable power machinery for running the same, be provided.

In order to collect and describe all fibers and fibrous products, it will be necessary to make investigations into the methods of growing the plants, the soil and climatic conditions under which they are grown, and the methods of preparing the fiber or other products for use. In order to carry out these investigations, I would recommend that provisions be made for traveling and collecting.

The chemical and microscopical investigation of fibers is one of the most important lines of work. It is desired in this connection to establish reaction schemes by which all Philippine fibers may be identified, and also to determine their physical characteristics, length, and thickness. In addition to this work it will be necessary to study the minute structure of the leaves and other parts of fiber-producing plants as an aid to determining the best methods and means of extracting the fiber and preparing it for market. For these lines of work I would further recommend that such chemicals and apparatus as are necessary be provided; and I would call attention to the necessity of having this equipment at the immediate service of this office, because of the necessity for its constant use, and because of its being an integral part of the equipment for fiber work.

Respectfully,

JOHN W. GILMORE,
Expert in Fiber Investigations.

Prof. F. LAMSON-SCRIBNER,
Chief Insular Bureau of Agriculture, Manila, P. I.

EXHIBIT E.

REPORT OF THE FARM MACHINE EXPERT.

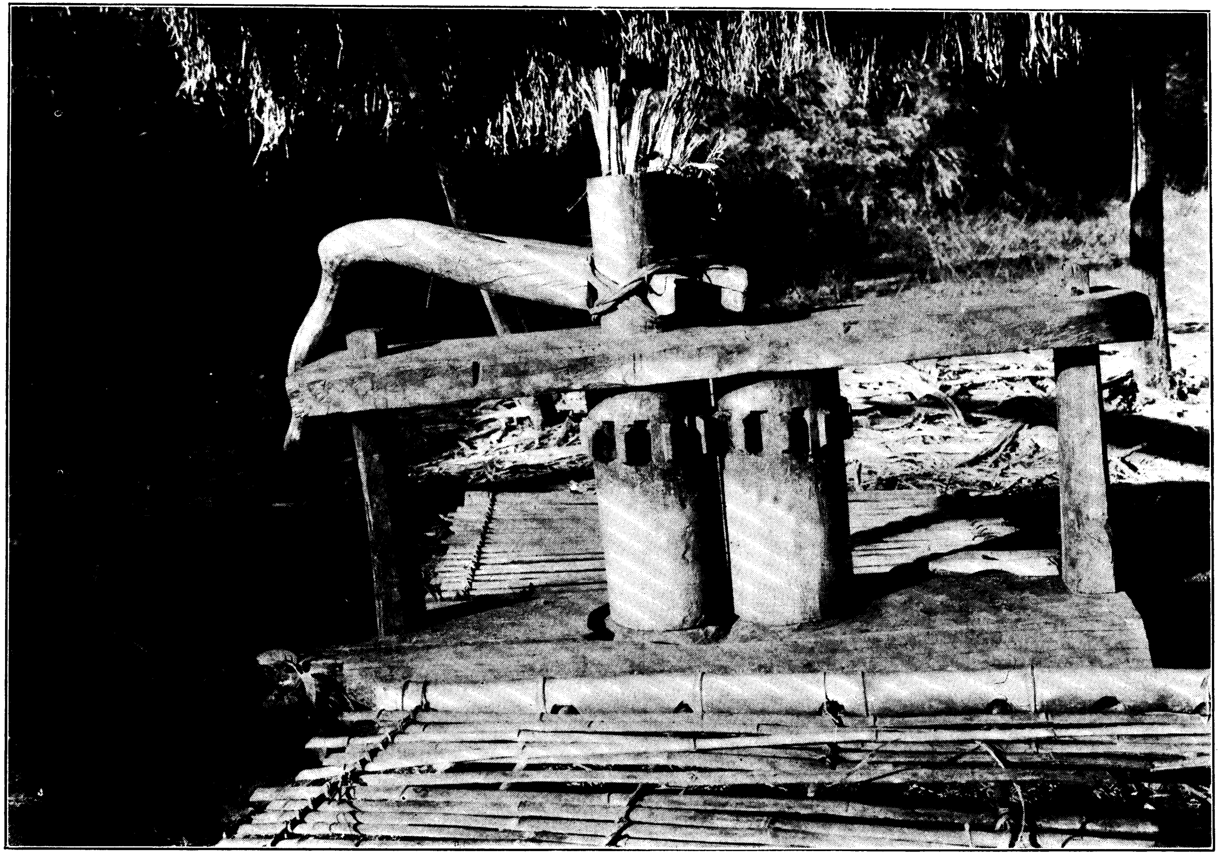
MANILA, P. I., *September 8, 1902.*

SIR: I have the honor to submit the following report on the work accomplished in my line of duty as farm machine expert in the insular bureau of agriculture since my arrival in these islands, April 21, 1902; also, recommendations as to the further importation and possibility of value and use of American farm machinery here.

The work accomplished has not been as great as I had hoped, but this is due to the fact that there was practically no machinery suitable for farm work in the islands until the arrival of that which was brought with us from the United States, and it took some time to get it to the building, to unpack it, and put it together for use.

Owing to an unavoidable delay in obtaining a suitable place near Manila, we have not been able to test the value of all the implements, but there is no reason why they may not be used, as the land is of such a character as to make it possible to use implements of all kinds.

Much of this machinery is now being used in Batangas under the direction of a member of this bureau, some has been loaned to industrial teachers in the department of public instruction, a few tools were tried in the province of Benguet and



FILIPINO AGRICULTURAL MACHINERY—CANE CRUSHER.

reported to work well, and some have been loaned for a short time to enterprising farmers who are trying to start farms but are unable to secure tools in the islands.

I have had entire charge of this machinery since its arrival, have set most of it in working order, and have kept it in as good condition as possible. My duty is to put this machinery in working order, see that it is kept in proper repair, and direct the use of the same on the government farms and experiment stations in the islands. The rainy season is now on and, as it rains most of the time, the soil is in no condition to cultivate, and very little can be done with our implements for at least one month.

After as careful a study of the conditions of this country as it was possible at the time to make, the kinds of machinery and tools selected were those that best suited the conditions in the islands. As we could not get all the information we wanted in advance, we were compelled to select a rather miscellaneous lot of machinery, and, knowing that this is a tropical country, most of the machinery is light and can be worked, in spite of the fact that the climate is hot and the soil in an uncultivated state, and has been so for a long time. Under the circumstances the selection was a good one, and most of it is just what we want, and all can be used.

The following farming tools and machinery we brought with us from the United States: Hill and drill seeders; single wheel hoes; horse hoes and cultivators; grain cradles, one-horse "Boss" plows; Syracuse I. B. chilled plow; sulky plow; Henderson's steel plow; No. 20 Oliver chilled plow; disk harrow; smoothing harrows; spring-tooth harrow; Henderson's hay tedder; sulky hay rake; wooden hand rake; steel garden rakes; garden hoes; garden scythes; weed and bramble scythes; short-handled, square-pointed shovels; long-handled, round-pointed shovels; wood axes; set of selected tools, including saws, hammers, screw drills, hatchets, chisels, planes, wrenches, bolts, rivets, etc.; knapsack sprayer; bucket pump with hose and nozzle; hay and straw cutter; hay forks, 3 tines; hay forks, 4 tines; two-horse wagon, Studebaker No. 3; grindstone; garden reels; corn knives; hand pruners; notched shears; Oakville lopping shears; 9½-inch steel shears; 8½-inch steel shears; ax mattocks; potato hooks; Borden's grass hooks; light grubbing hoes; Warren hoes; serrated grass hooks; farmer's riveter and rivets; 5-inch steel trowels; 6-inch steel trowels; 9-inch English scuffle hoes; telegraph pruners; two-horse Buckeye mower; one-horse Buckeye mower; grass scythe snaths; bramble scythe snaths; four-runner rice drill; No. 1 Hercules hand press; No. 2 Hercules hand press; No. 107 big bolt plows; No. 408 Rainbow plows; 12-inch middle burster plow; IX Hindoostan plows; Pluto disk plow; rotary harrow; Union drill No. 16; delta cultivators; orchard harrows; Orleans cultivator; Cosmopolitan gang plow; Georgia stocks, No. 2; Diamond tooth cultivators, two-horse; Hall rotary disk cultivator; Louisiana cane knives; 2R brush hooks; rice sickles, No. 2; Lyndon, La., neck hoes, No. 2; Bodley subsoil plows; Hall clipper plow No. 2 L; steel rice binder; No. 3 Engelberg rice huller and polisher; Mason's hand-power coffee pulper.

I believe American machinery will help this country wonderfully, and I am positive that it can be used to great advantage; but it will take some time to change the present methods of farming among the natives, and this will have to be done by example. This machinery will have to be used on the Government farms, and at first by Americans; and after the natives see the advantages to be gained they will take to it, and not before. No amount of talking will convince them that their method is a poor one, but they must themselves see the work done.

Under their system of cultivation (especially of rice), it would not be practical to use American implements, because they transplant their rice from seed beds and wait until it begins to rain every day before they prepare the land.

There are seasons in which the work must be done, as well as in the States. While we do not have winter and summer here, we have the wet and dry seasons, which amount to practically the same thing as far as agriculture is concerned. Just at the end of the dry season, when the showers begin, would be the time to prepare the soil with American machinery and plant the crops that like plenty of rain. At the end of the rainy season would be a good time to cultivate and plant the crops that are suited to the dry season, such as vegetables.

There is no reason at all, if this system is carried out, why American machinery and implements can not be used with the same success as in the United States, as there are some beautiful level rich tracts of land in the islands. We have enough machinery on hand to stock about two farms; but if other farms are started it will be necessary to import duplicates of that which we now have, as there is practically no other machinery in the islands, and we are constantly called upon for tools by those who wish to start farming, and the demand for light plows, harrows, and other farming implements is constantly increasing, but we are unable to supply them. As most of the implements we have are for general farm use only, it would be well to import a coffee huller and polisher, a rice thrasher, a cotton gin, and some fiber machinery.

The machinery is now ready for use, and we are well equipped in this line to begin work on the Government farms.

Respectfully,

James H. Shipley,
Farm Machine Expert.

Prof. F. Lamson-Scribner,
Chief Insular Bureau of Agriculture, Manila, P. I.

Exhibit F.

REPORT ON LA GRANJA MODELA, AT MAGALANG.

By M. R. Healy.

Report on La Granja Modela, or Government Farm, near Magalang.

Manila, P. I., *November 23, 1901.*

Sir: Acting under instructions contained in your letter of 15th instant, I visited the Granja Modela, near Magalang, and respectfully submit the following report:

Granja Modela is 8 miles from Angeles, which is the most convenient railroad point. The road is poor, but could be improved at the present time with comparatively small cost; estimated by the military engineer now at Angeles at about $1,000 gold per mile. The engineer has just completed some military roads in the district and has all the necessary material and instruments on hand.

(1) *Buildings.*—One octagon-shaped building about 25 feet in diameter, stone foundation, with walls and roof of corrugated iron; 1 shelter for about 20 horses, corrugated iron roof, no walls; 2 small shelters for grain and hay, iron roof, no walls; 2 buildings in course of construction, each 170 by 20 feet, framework completed, to be finished with nipa roof, fitted to accommodate 200 horses; 1 two-story building, framework complete, to be finished with nipa—upper floor to be used as quarters for men, lower floor as storehouse. Farm and buildings occupied at present by the military government as a hospital for sick and broken-down horses.

The Granja Modela is nearly 5 miles long by about 1 mile wide, and on the north and west adjoins lands at present occupied by natives. Beginning at the northeast, the boundary is marked by a row of bamboo stakes about 4 feet high, then by the river, and afterwards by a row of bamboo poles 8 feet high with a white flag. These stakes have been placed about 30 yards apart on the boundary of the Granja Modela, where it adjoins the farms of the natives. On the east and south the Granja Modela runs back to Mount Arayat and vacant government lands. The soil is a rich sandy loam. One-half the farm is low-lying and the rest rolling land, running back to the foot of the mountain. Fully one-fourth of the farm was at one time under cultivation of rice, as the remains of the paddies can still be seen. The remainder of the farm is covered with a thick underbrush; there are no trees of large size until the foot of the mountain is reached. The remains of some machinery lies in the brush which looks as if at one time it was part of a sugar mill with a sawmill attached.

Rice, sugar cane, tobacco, alfalfa, corn, hemp, and possibly cotton would grow well on this land.

(3) There is a large creek running on three sides of the farm, so that a complete system of irrigation can be carried out on all parts of it during the entire year.

(4) No crops are raised on the farm at present.

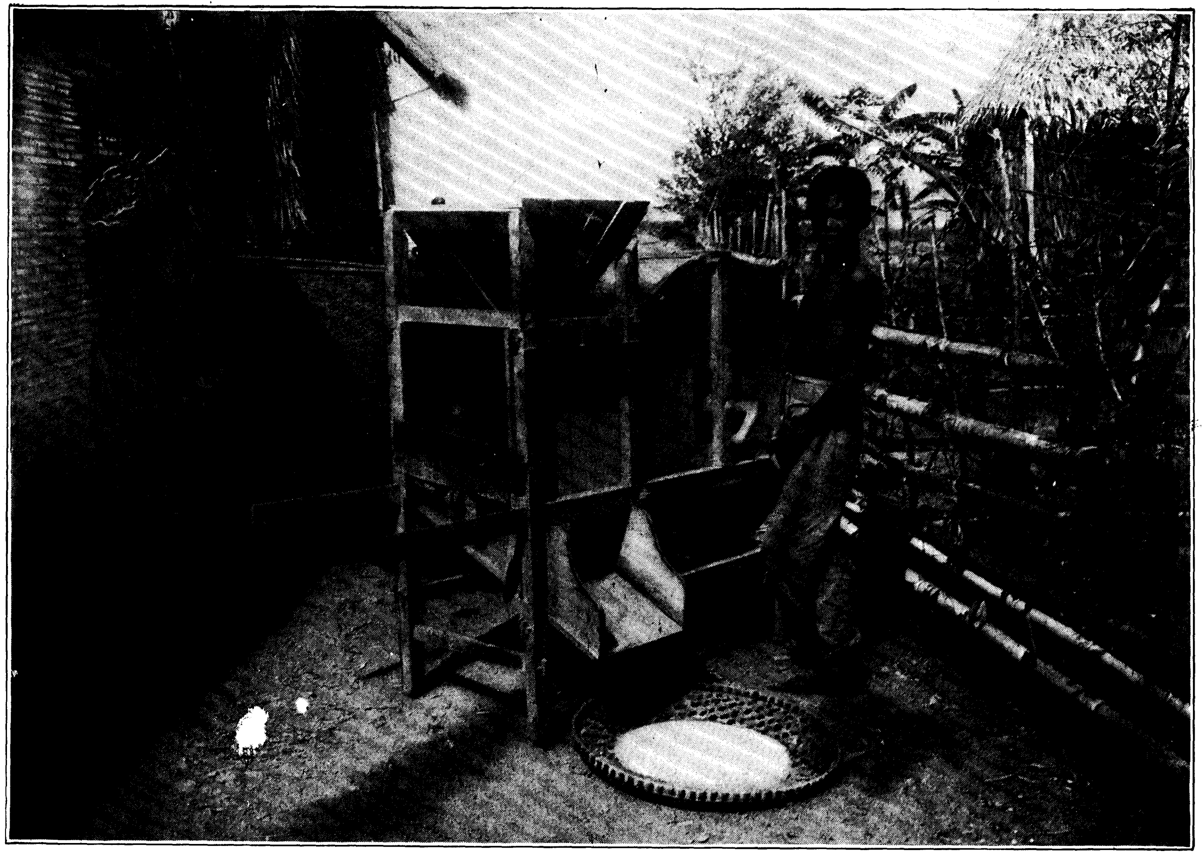
The officer in charge of the farm at present for the military government is Lieutenant-Colonel Hatfield, Fifth Cavalry, stationed at Angeles.

Trusting this report will meet with your approval,

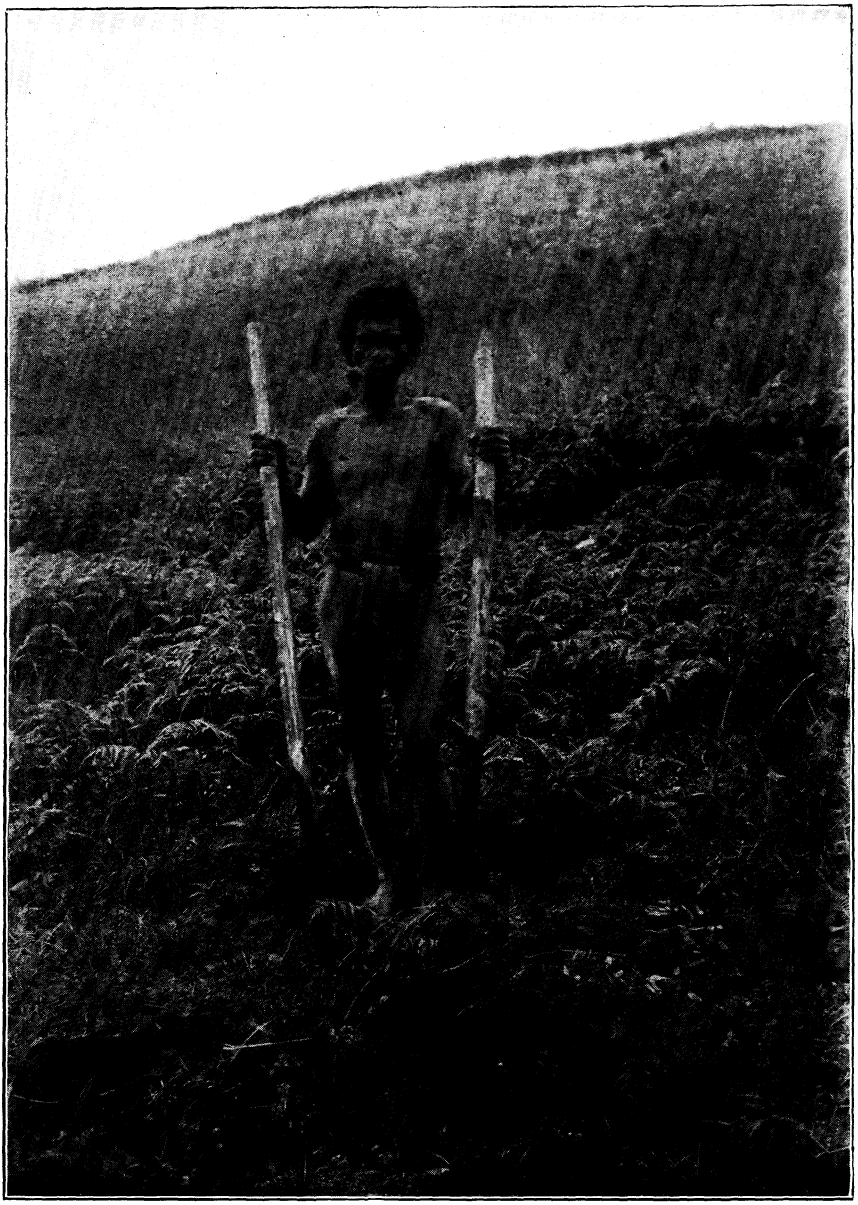
I remain, sir, yours, respectfully,

M. R. Healy.

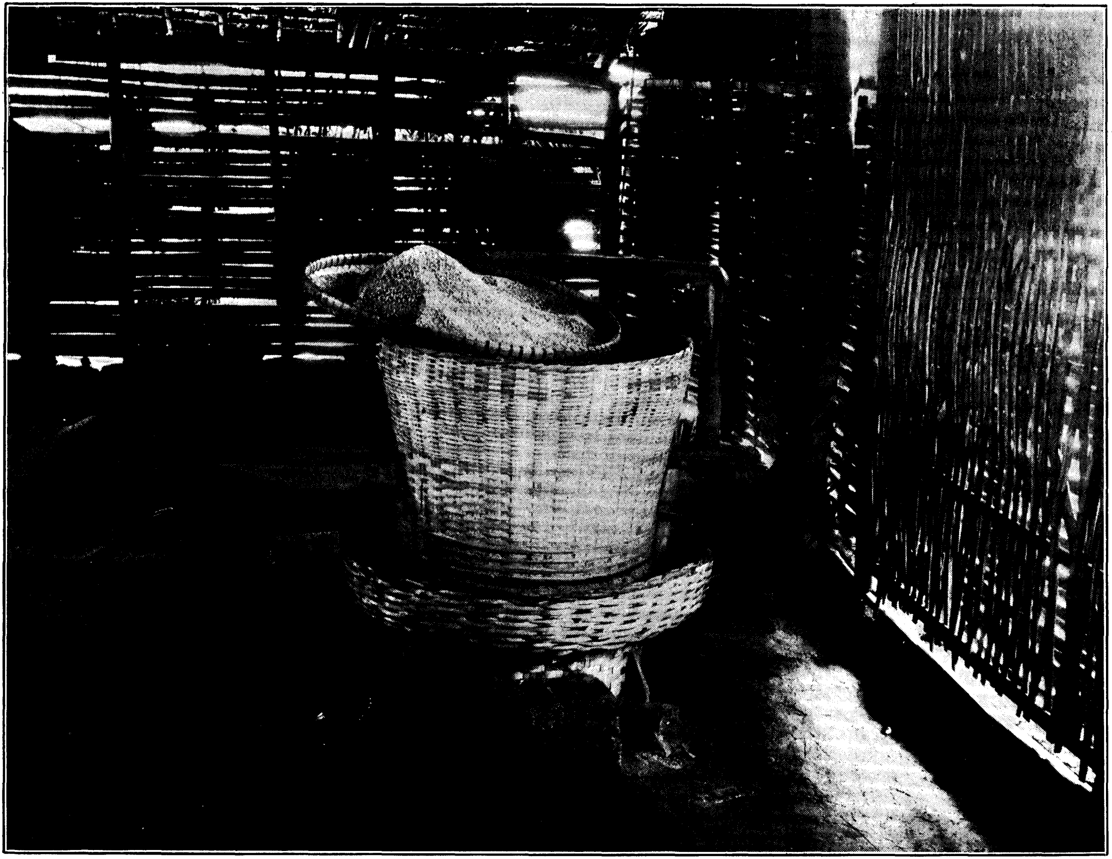
Hon. Dean C. Worcester,
Secretary of the Interior.



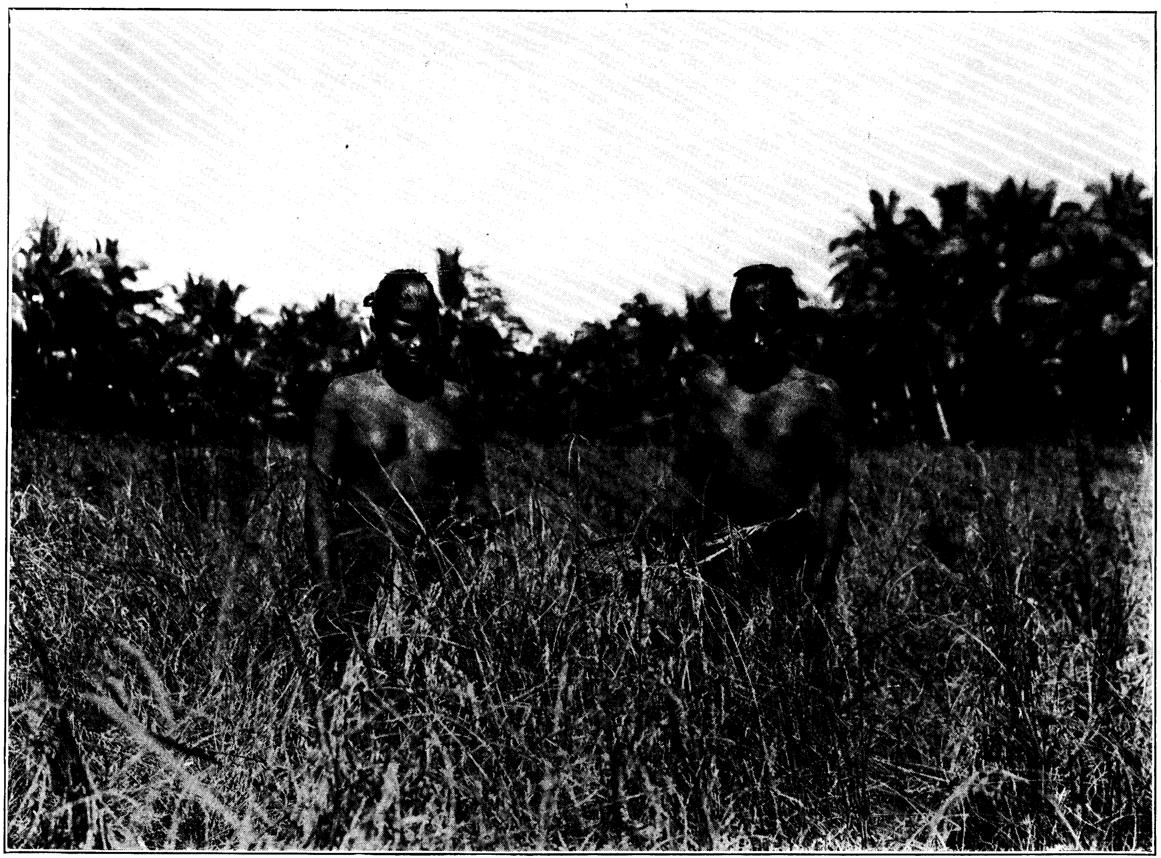
FILIPINO AGRICULTURAL MACHINERY. FANNING MILL.



PRIMITIVE AGRICULTURE. THE IGORROTE TURNS OVER SODS WITH A PAIR OF POINTED STICKS INSTEAD OF PLOWING.



FILIPINO AGRICULTURAL MACHINERY. RICE-HULLING MACHINE.



PRIMITIVE AGRICULTURE. TAGBANUA WOMEN HARVESTING RICE, CALAMINANES ISLANDS.

EXHIBIT G.

REPORT ON LA GRANJA MODELA, AT MAGALANG.

By the SOIL EXPERT.

MANILA, P. I., *June 6, 1901.*

SIR: According to instructions contained in your letter of June 1, 1902, in company with Mr. W. S. Lyon, of this bureau, I visited La Granja Modela, in the province of Pampanga, and have the honor to submit the following report.

Respectfully,

CLARENCE W. DORSEY,
Soil Expert.

Prof. F. LAMSON-SCRIBNER,
Chief Insular Bureau of Agriculture, Manila, P. I.

LOCATION OF THE FARM.

La Granja Modela is situated about 40 miles northwest of Manila, in the northeast corner of the province of Pampagna, near the village of Magalang, which is 8 miles northeast of Angeles, an important town on the Manila and Dagupan Railroad. The farm lies near the foot of Mount Arayat, an extinct volcanic cone rising nearly 3,000 feet above the valley floor. The western boundary of the farm is marked by a small stream, while the eastern limits extend up the mountain side into unbroken forest. A small tract of bottom land, 50 acres in extent, lies to the north of the road that divides the farm, but the greater portion is high, gently rolling or sloping land, that overlooks the entire valley to the west. It is difficult to ascertain the exact size of the farm, for only a few hundred acres have ever been cleared, while the remainder is heavily timbered steep mountain slopes, the limits of which are not well defined. Well-informed Filipinos say the farm extends to the summit of the mountain, in which case the farm doubtless contains several thousand acres.

CHARACTER OF LAND COMPRISING THE FARM.

BOTTOM LAND.

Along the stream to the left of the road that divides the farm there is an area of well-defined bottom land that perhaps contains 50 acres. This land has been terraced for growing rice, although no crops have been grown for a few years. The soil is a deep, heavy loam or clay loam of a black color, well adapted to growing rice, and with proper drainage and cultivation would undoubtedly give good results with sugar cane. This soil is apparently in good condition, and has not been ruined or exhausted by improper methods of cultivation. It is a rich soil of lasting fertility, and is, in my opinion, the most valuable piece of land on the farm for growing rice or sugar cane. Señor Feliciano, presidente of the village of Magalang, informed us that the Spanish had attempted growing sugar cane on this land for one year, but the experiment was a failure.

ROLLING LAND.

The greater part of the farm which has been cleared occupies gently sloping and rolling mountain foothill land. All of this portion of the farm lies well above the general valley floor and apparently high enough for good natural drainage, yet such is the character of the underlying subsoil and general surface conditions that scores of small depressions are scattered about which, during the greater part of the year, are filled with water, some to a depth of at least 2 feet. These small swampy spots or bog holes would seriously interfere with any extensive cultivation of the greater part of the rolling land, and would require considerable outlay to thoroughly drain and put in shape for cultivation. The soil of the greater part of the rolling land that has been cleared is a dark sandy loam, rich in decayed organic matter, and contains sufficient clay to make it loamy. When dry it becomes baked and packed together. The soil is about 6 or 8 inches deep, and overlies a stiff, yellowish, sandy clay that prevents the rapid percolation of rain water through it. It contains brown iron-ore stains, showing the effects of imperfect drainage. The soil is not adapted to general farming on account of the impervious subsoil, and because the soil, after a few years of continuous cropping, would need to be well fertilized to restore the fertility. In some places the soil is more loamy, but is always underlaid by the same yellowish, stiff, sandy clay subsoil. In many places both soil and subsoil have been washed away, exposing the vesicular, lava-like rocks. From the many places where washing has revealed the underlying rocks it is to be inferred that over the greater part of the upland portion of the farm the depth of soil nowhere exceeds more than a few feet. In some few places the soil covering is not more than a few inches in depth, and as one approaches the mountain rounded bowlders of volcanic rock become more abundant and of greater size. This land, although it could not be readily farmed on a large scale, could be utilized in its present condition for growing vegetables and truck crops which mature in a short time. In its present condition the land does not afford good pasturage during the dry season, and unless greatly improved is not well adapted for stock raising. Moreover, this farm has been recently used for recuperating sick and worn-out cavalry horses, and from exposure and other causes many horses died, and piles of bones are scattered about over the farm.

For ordinary purposes the water supply is sufficient, for the small stream on the west of the farm flows the entire year. Other small streams cross the farm, but they contain no water during the dry season. Hence, for irrigation purposes, the water supply on the farm is probably insufficient and could only be procured at considerable expense.

EQUIPMENT OF FARM.

The buildings and improvements located on the farm are not extensive and are of little value. Two large sheds built of bamboo and adapted for stabling horses are partially constructed, but are without roofs. There are also a few bamboo houses of little or no value. There is one building constructed of corrugated iron sides and roof, of octagon shape, that rests upon a stone foundation, that may be of some value. It has been used as a storehouse. Bamboo fencing surrounds one field of several acres. Overlooking the 50 acres of bottom land there is a portable engine, a 3-roller cane crusher, and evaporating kettles set in brickwork, and a solid brick chimney and scattered pieces of corrugated iron roofing. This sugar machinery was brought there by the Spanish at a considerable expense, but was never used.

CONCLUSIONS IN REGARD TO THE DESIRABILITY OF RETAINING THE FARM.

For the purpose of using this farm as a botanic garden and trial grounds, its inaccessibility to Manila is the chief objection. Angeles, the railroad station, is several hours by train from Manila, while the farm is 10 miles from the station, and the road, at certain portions of the rainy season, may, in its present condition, be impassable for several days. For the purpose of a general experiment farm the farm is not desirable, for, with the exception of the small tract of bottom land, the land is not rich, fertile land, but has always been rated by the local farmers of the region as second-grade inferior land, and would require considerable outlay to make it valuable land. It is said that the land was originally chosen by the Spaniards who knew little of practical farming, and consequently did little to improve the farm, and hence few, if any, practical results were obtained.

When all things are considered, such as inaccessibility, poor soil, uneven surface, poor drainage, difficulty of obtaining an abundant water supply for irrigation, and lack of improvements, it would certainly seem inadvisable to attempt to use such a farm for any of the purposes which the bureau of agriculture expects to accomplish.

POSSIBLE LOCATION FOR AN EXPERIMENTAL FARM.

Between Angeles and Manila, while the country on either side of the railroad is quite similar, there are some places that may be suitable for an experiment farm. The greater portion of the valley traversed by the Manila and Dagupan Railroad is low and but a few feet above standing water, and is therefore largely used for growing rice. However, there are some higher, better-drained locations that are adapted to the growth of sugar cane and other crops. The largest area that is high and well drained is just south of Calumpit a few miles. There is there a tract which probably contains a few thousand acres that is quite level, possesses good soil that from the train appeared to be well-drained fertile loam several feet in depth. From all appearances this tract of land seemed to be the finest along the road. The soil is rich and easily cultivated, and appeared well adapted to sugar cane and forage crops. South of Malolos a somewhat similar area of soil was observed, but it did not appear so large. Other small tracts of high well-drained land were noticed, but generally such were found to be underlaid by the same volcanic rock that crops out on the proposed military reservation at San Pedro Macati.

In regard to the location of a farm farther away from Manila and in a different location from that at Magalang, all of the prominent Filipinos whom we met at Magalang strongly recommended the tract of land between the stations of Capas, Murcia, and Tarlac, in the province of Tarlac. There they all said were rich soils, varying surface conditions, such as rolling foothills, valley lands, and a variety of crops, and even virgin forest land, all to be found in a small district and admirably adapted for the purpose of an experimental farm that might be established which would prove of great benefit to the people of the neighboring provinces.

Exhibit H.

REPORT ON LA GRANJA MODELA, NEAR LA CARLOTA, ISLAND OF NEGROS.

Manila, P. I., *January 9, 1902.*

Sir: Acting under instructions contained in your letter of December 5 I visited La Granja Modela, near La Carlota, Isle of Negros, and report as follows:

La Granja is about 30 miles from Bacolod, the capital, and about 20 miles from Valladolid, the nearest port. The roads are very poor, even in the dry season.

1. The buildings on the property are: 1 sugar mill, with nipa roof needing repairs; contains 1 roller needing repairs and cleaning, 12 evaporators, 2 sirup vats, 2 large iron coolers, 1 furnace, etc., in good order. The mill is run by water power. One dwelling house of molava wood, not complete, 45 by 22 feet, with L 12 by 12 feet, no furniture, windows, or stairs, nipa roof; 1 warehouse 30 by 55 feet, corrugated iron, cement floor, and good condition; 1 brick building, 65 by 28 feet, cement floor, iron roof needing repairs; 1 observatory of stone and wood, about 50 feet high, in good order, no furniture; 1 large native dwelling, occupied by caretaker, and about 50 small native buildings, only a few of which are occupied.

2. La Granja contains 775 hectares of level land, but, running back toward the foothills, it has within its area a range of low hills rising to a height of about 500 feet. The boundaries are marked on the north by the river, on the east and south by a row of trees and a road running along the boundary, and on the west by a canal. There is at present on the farm about 4 acres of betel nut, mixed with a few cocoanut trees; 5 acres of bananas, 4 acres hemp, 140 acres sugar cane, 2 acres campeche trees (manufacturing red color), 1 acre of pineapple, a few coffee trees, some sweet corn, sweet potatoes, and string beans.

The soil is a rich clay, about 4 feet deep, and can grow nearly all crops that are raised in the Philippine Islands, including rice, sugar, corn, hemp, coffee, bananas, betel nut, cocoanut, cocoa, maize, tobacco, alfalfa, and oats; also all vegetables, such as cabbage, tomatoes, lettuce, onions, pumpkins, watermelons, etc., and the various fruits, oranges, lemons, peaches, etc., and I believe strawberries.

3. Two large streams run through the farm, from which irrigation could be carried on successfully during the entire year.

4. The crops now growing on La Granja were sown previous to April 30 of last year, when Señor Juan Araneta, then superintendent, was relieved from office by the military governor of the province. Later in the year Señor Araneta was notified by the department of education that they were sending a man to take charge of the farm. This man came, but, not having sufficient authority, refused to sign a receipt for the farm and stock, and merely visited the farm two or three times. In this manner the care of La Granja has been left to Señor Juan Araneta, without his having authority to cultivate or care for the crop. As there is at the present time a crop of sugar on La Granja which requires to be cut not later than February 1, the estimated value of which is 15,000 to 20,000 pesos, and there being but six carabaos on the place (the machinery and implements all needing repairs), the farm being in debt to its labor to the amount of 1,000 pesos, and no funds. Considering these conditions, I thought it advisable to reappoint Señor Juan Araneta superintendent of La Granja on the same terms of his former holding of the position, viz, 3,000 pesos per year, with directions to proceed at once with the saving of the present sugar crop, arranging that two-thirds of the crop go toward the cutting and saving the sugar and one-third of the gross produce to be the property of La Granja. This appointment

subject to the approval of the secretary of the interior, a copy of my letter to Señor Araneta being hereto attached.

An inventory of stock and machinery on hand showed 6 carabaos, 1 belonging to military. In sugar mill, 1 iron rake, 1 hay tedder, and 15 two-wheel carts needing repairs; in warehouse, 150 cavanes of rice of 75 pounds each, 50 cavanes of corn, one-half cavan of string beans, etc., and 1 picul of hemp of good quality; in brick building, 1 iron roller crusher, 4 English plows, 1 set rollers for sugar mill, 1 iron bench saw with assorted saws, 12 to 18 inches, and miscellaneous machinery and tools; in Señor Araneta's hacienda, scientific instruments and books, as shown in his inventory. All the implements and machinery are of English manufacture.

As the soil of La Granja is firm and dry, mules could possibly be worked to better advantage than carabaos in cultivating it. The large river running through the property could be made to furnish electric power and lighting for the farm, and possibly also supply the neighboring haciendas with power and light at less cost than their present system. The department of education is looking for a site for an agricultural school in western Negros, and, I believe, considers La Granja Modela the best location for the purpose.

Should La Granja be selected as the site of a school it might prove of mutual benefit, as the school would have the advantages of practical model farming and forestry, and the farm would have the benefit of the scientific experiments of the school.

Attached hereto are: List of labor indebtedness of La Granja Modela, by Juan Araneta; inventory of stock, etc., of La Granja Modela, by Juan Araneta; copies of letters and receipts from military governor and department of education to Juan Araneta; copy of letter of appointment from M. R. Healy, special agent, department of the interior, to Juan Araneta; map of La Granja Modela, La Carlota, Isla de Negros.

Trusting that the above report will meet with your approval, I am, sir,

Very respectfully,

M. R. HEALY.

HON. DEAN C. WORCESTER,
Secretary of the Interior, *Manila*, *P. I.*

EXHIBIT I.

REPORT OF OSWALD A. STEVEN ON THE MODEL FARM IN WESTERN NEGROS, LA GRANJA MODELA.

MANILA, P. I., *March 19, 1902.*

SIR: By your instructions dated February 11, 1902, I visited La Granja and made a thorough inspection of the estate, buildings, soils, etc.

An analysis of the soils brought from there will determine their quality. Apart from minor objections, the one of location is its chief drawback. It is your intention to erect expensive machinery, the cost of which you intend to refund by a revenue derived from the grinding of sugar cane from adjoining plantations.

La Granja is situated 9 miles from Porta Vedras, the shipping point of that locality, at an elevation of about 200 feet. With the exception of one, the plantations are all at a lower elevation and lie to the sea. It is impracticable to haul cane uphill to a mill, also long hauls of the sugar to point of shipment entail a large outlay of money for good roads and tramways. From a safe commercial standpoint, I use the word "impossible" with regard to La Granja.

Again, the plantations in the vicinity have been cropping cane for fifty years without any return to the soil, and it is an acknowledged fact that the land in this vicinity is showing clearly an unhealthy condition by the smaller returns of sugar.

A modern mill should be erected in a locality where it has every advantage; especially so this first one, for criticism will be very ready, and returns in dollars and cents will be the chief incentive to encourage what you are endeavoring to promote, namely, the increase of the sugar output of the Philippine Islands by new methods, new cane seed, and new machinery.

Again, I wish to say that only by the increased money returns from such new methods will you be able to convince the present planter so that he may change his method, or the agent of such plantation, or the capital of this country to lend money to such planter, to enable him to purchase such new machinery. Therefore, your model estate and mill should not be placed in any location where it is handicapped by the slightest objection if it is possible to avert it.

I would draw your attention to the fact of expensive instruments owned by the government lying around loose in nipa shacks. There is a fine Russel chronometer in perfect order that might be brought here and saved. Also, that the corn, rice, etc., in the storehouse is partly destroyed by weevils; also that the laborers' houses on the plantation are occupied by people who do not work on the place, supposedly rent free. Also, that there are only about 8 hectares in cane, which they are grinding now. The sugar, owing to its poor quality, will not realize over 1,000 pesos. The long hauling from La Granja to point of shipment is illustrated here again; it will be expensive. I believe the returns from the estate this year will fall below its existing labor indebtedness unless the most careful management is exercised.

There are about 3,000 abaca on the place, but it is being cut by anyone, returns from which will not accrue to this place. I think 300 pesos could be realized from this alone if workmen were employed at once during the balance of the dry season to make the crop; but the complaint is that no workmen can be gotten, owing to all in the neighborhood being now creditors without hope of being paid for past work. The amount due is computed to be 1,000 pesos. My advice is to send some white man who can whip the present yield into shape, give him full power to act, and clean up to the best advantage.

As an industrial farm, La Granja may be made all right; as a model sugar estate and experimental station, it has nothing to recommend it.

Very respectfully,

Oswald A. Steven.

Hon. Dean C. Worcester,
Secretary of the Interior.

Exhibit J.

REPORT ON THE SAN RAMON FARM IN THE PROVINCE OF ZAMBOANGA.

By Wm. S. Lyon.

Manila, P. I., *September, 1902.*

Sir: I have the honor to present herewith my report on the government farm at San Ramon, near Zamboanga in Mindanao, and which I visited in accordance with your instructions under date of July 16, 1902.

Respectfully,

Wm. S. Lyon,
In Charge of Seed and Plant Introduction.

To Prof. F. Lamson-Scribner,
Chief, Insular Bureau of Agriculture, Manila, P. I.

REPORT ON SAN RAMON FARM.

This property is located on the Zamboanga Peninsula, about 16 kilometers northwest of the town of that name, and from a blue print and abstract of title (Spanish) upon the premises, it may be seen that it has for its westerly boundary an unprotected frontage on the Joló Sea. Its easternmost boundary is far up into a heavily timbered mountain chain, whose approximate height at that point is 800 meters, and the whole estate by map scale amounts to 2,200 hectares.

Between the blue print and the written description there is a marked discrepancy, best illustrated in the accompanying rough diagram, which shows the River Tigayan to be the northerly boundary of the property until its confluence with the River Sax. The abstract, however, claims only to the Sax, but as the land included up to the first-named river is partly in cultivation by the representative of this bureau, is in his possession, and there are no adverse claimants to it, and is required to make up the 2,200 hectares called for by both abstract and blue print, it may be considered as a parcel of the estate.

Fully four-fifths of the estate lies between the easterly branch of the Sax and the sea, and practically all of the great body is susceptible of easy reduction to cultivation. The soils, of fine alluvial sediment, are too diversified in character to admit here of other mention than to note their exceptional fertility, good natural drainage, and assured fitness for corn, cotton, cane, cacao, cocoanuts, and abaca. From the easterly branch of the Sax to the sea is a distance of about 6 kilometers and has a uniform and gentle slope amounting to perhaps 60 meters in that distance. This whole surface is broken by very few gullies, and may be, if desired, nearly all controlled by irrigation waters, of which the Sax furnishes at all seasons an inexhaustible supply, as well as ample motive power for an extensive milling, grinding, or sawing plant of large capacity. The hills east of the Sax are densely covered with hard-wood timbers of great size and variety. Among them I noted panas, molave, narra, and many unfamiliar species.

I cut trails about three measured tracts, counted the trees on each, and compute a minimum average yield of 22,000 feet board measure per hectare for the whole tract. Much of this timber has reached the zenith, and its harvest can not be deferred many years without positive forest deterioration.

To the eastward of the line marked "brush lands, uncleared," and thence to the Sax, and comprising nearly 800 hectares, there lies a more sparsely covered woodland, once partially harvested, but which still retains isolated timber trees of great size and value. These, without detriment to any tropical crops other than rice and sugar cane, could be left standing and the land otherwise cleared and subdued to agricultural uses at a cost of $14 to $15 gold per hectare.

Most of this tract is a deep, strong loam of dark color, underlaid by fine gravel, and is so situated that it is protected by the mountains from northeast monsoons and well sheltered by the cocoanut groves from the southwest gales. It is well adapted to many tropical cultures, but offers an especially promising field for extensive plantations of cacao, in this respect being the only site I have seen fulfilling so many of the requirements for the profitable growing of that crop.

The little plat marked "Cacao" on the diagram exists only in name. The trees were aged, 5 or more meters high, but were invisible at a distance of 20 paces by reason of the jungle growth that had invaded them during three years of neglect. The agent of this bureau has cleaned up the grove, cultivated them, and reduced them to order. That they should still be alive is an eloquent testimonial to the suitability of their environment; but, owing to the constitutional inability of the cacao to resist neglect and the diseases that come to it, I think it unlikely that the grove can ever be restored to a fully normal and profitable condition.

From the seashore and running inland a distance of 1 kilometer, the present cultivations and plantings are confined to cocoanuts and abaca. Of the latter there are approximately 20 hectares set out and of the former, although more scattered, and consequently more difficult to estimate, in the vicinity of 25 hectares.

Including the cacao and a small garden, the total active cultivations of this estate of 2,200 hectares will not much exceed 50, nor are there evidences to show that at any time during the Spanish administration and during the time when they had as many as 700 convict laborers at work did the total amount of land in operation ever amount to more than 150 hectares.

The faulty, haphazard system adopted in the first plantations of abaca has continued to make its present cultivation costly, as all labor thereon must, as heretofore, be continued to be performed by hand. The more recent plantings inaugurated by the agent in charge have been upon a better basis and will admit of the use of animals and improved farm implements. Until such time, however, as these are furnished to him, he is compelled to maintain a force of about 70 hand laborers, a force that could be reduced fully one-half if adequate substitutes in the way of farm animals and implements were available.

The cocoanuts planted by the former administration are symmetrically and generally well planted, with the single fault, if any, of too close planting, an error which I suggested should not be perpetuated in future tree setting.

The copra produced along this coast is of superior quality, and recent sales at the ship sides have been made at $8 Mexican per picul, equivalent to about $47 gold per ton. The average run of Indian copra in the London market at the same time only brings $45 gold delivered. The difference can only be explained in the greater oil yield of the Zamboanga product.

Reference to the diagram will show that there was a considerable planting of both cane and sugar upon the farm prior to its transfer to this bureau. The former is stubble cane of the third year and, the mill upon the estate being in a state of complete wreckage, I have suggested to the agent in charge the exchange of the now fast-maturing stubble to those natives who have hand mills in return for a complete clearing of the lands so occupied, and that, as soon as he is provided with the proper farm equipment, he plant corn and beans until such time as the whole can be laid down in cotton. This recommendation was prompted by observing at Tetuan upon nearly identical soils an exceptionally thrifty growth of cotton. It is true that the staple produced was short and defective, but the plants I noted had been grown as perennials, and the fruits obtained were entirely aftermath. I think, further, from the similarity of these sugar lands to the most famed of the Oklahoma cotton lands, that it would be entirely safe to make this plantation upon a commercial rather than an experimental scale.

With regard to the personal property on the farm, there is now on hand all that the agent in charge receipted for, with the exception of a steam pump and a kit of mason's tools that were sequestrated by the military government of Zamboanga. In addition to this there is a very considerable number of articles in his possession that are not inventoried and not claimed by the military government, and that were turned over to him by Major Stivers. The articles turned over per inventory, and those uninventoried, can only be classified as worthless junk. I use the word "worthless" advisedly, as in the absence of a foundry at Zamboanga their transportation to any point having a market for old castings and forgings would probably exceed their value.

To this classification are two notable exceptions: (1) A very complete and valuable steel-table metal-working power lathe; (2) an entirely new and unused 25-horsepower tubular steam boiler. The former machine, together with such fragments of machinery as could be of possible use in future reconstruction work, have been carefully housed and protected by the agent in charge.

The boiler has suffered from some exposure to the weather, but the recent completion of a very well constructed tool and storehouse will insure its protection from further injury.

Further, every piece of property acquired by the agent in charge since his accession to the property is fully accounted for, all tools and implements not in immediate use being carefully cleaned, put away, and kept constantly under lock. In this particular his administration is of the best, far better than upon most individual farms, and he is deserving of credit for the same.

The realty improvements at San Ramon consist of a very large structure designed to house the first-class modern sugar mill, with its full equipment of engines, vacuum pans, and centrifugals, as well as a ten gang-saw sawmill. The galvanized-iron roofing of this building is in bad repair. Many of the roof timbers have rotted and much of the roofing made away with. Most of the mill machinery has been looted, and articles too heavy to carry away, such as driving or fly wheels, have been maliciously broken with sledge hammers. The walls of the building, a fine quality of pressed brick and excellently laid, stand intact, and represent good value as a basis for any desired future structural work. Its reconstruction as a sugar mill, owing to its distance from lands especially adapted to cane growing, is not to be recommended, but it presents inviting inducements for conversion to sawmill uses by reason of nearness to an undoubted lumber supply, abundance of power, and the facility with which logs may be brought to mill by gravitation and thence as dressed lumber by the same power to tide water.

Other structures consist of an excellent and commodious residence, commenced by the military and completed by the agent of the bureau, who from old material upon the place has also lately completed the building of a much-needed warehouse for the storing and packing of hemp and copra, as well as for the housing of large farm implements or other machinery.

Beyond these and the small nipa shacks of the native estate laborers there are but two large and dilapidated buildings, originally erected as residence quarters, since occupied by the military, and now only worthy of the torch.

Taken in all, the San Ramon farm exhibits to an unusual degree all the conditions of phenomenal soil fertility, remarkable salubrity, and the nearly ideal climatic standard that entitles it to rate as a tropical agricultural property of exceptional value, and one that offers facilities for private enterprise exceeding any of like area that I have seen in the archipelago. Nevertheless there are equally important considerations that indicate the grave impropriety of operating it under governmental subsidy as either a model farm or an agronomical experiment station.

Briefly stated, the most cogent reasons are:

1. Remoteness by mail or telegraph from the main or controlling office of the bureau.

2. Total lack of road or land communication with the nearest town; and owing to the necessary bridge construction, after consultation with an engineer in Zamboanga I fix $50,000 gold as the minimum for which any road could be constructed.

3. The uncertainty of water transportation and the delays which are incident to long-continued head winds and powerful coastwise currents.

4. And far the most important of all, the absence of practically any farming constituency for a certain radius of quite 15 miles, together with the absence of any roads or any trails in any direction that could possibly make it accessible to any farming community outside of these limits.

All agricultural enterprise conducted under government auspices is primarily maintained for the purpose of illustrating by precept and practice the benefits that inure to the farmer by the exercise of the best methods and systems in vogue.

If it is determined to continue to operate the San Ramon government farm for purposes of revenue only, then it becomes the urgent duty of the bureau to assume some of the paternal responsibilities that attach to the individual planter in all tropical regions.

Long and unchallenged experience has demonstrated that upon plantations remote from settlements the necessary labor supply can only be secured by inducing the natives to build and settle with their families upon the estate. In that case the planter must take directly in hand the policing of the village, its sanitation, and the medical care of the sick and convalescent.

So far as he was able, the agent in charge has fulfilled these functions of paternalism with great good judgment and skill, but has been compelled to defray all of the expense thereof from his own pocket.

As the success of the whole enterprise will hinge mainly on the labor question and the maintenance of its efficiency, it is dictated by both policy and humanity that he at once be equipped with an ample hospital outfit, adapted to the needs of 75 men and their families, amounting to a total of about 350 souls.

Among minor details, but of equal necessity for the economical management of the estate upon a good revenue-paying basis, I further recommend the purchase of not less than fifteen head of carabaos and an assortment of farm machinery for the working of general field crops.

EXHIBIT K.

REPORT OF THE MANAGER OF THE SAN RAMON GOVERNMENT FARM.

SAN RAMON, *Zomboanga, July 15, 1902.*

SIR: The San Ramon Government farm, as a whole, is a fine tract of land. A portion of the soil is a sandy loam and a portion black waxy clay, all of which is fertile and adapted to hemp, cocoanut, rice, and sugar cane, or any fruit or vegetable grown in the Tropics. The place is overrun with an undergrowth, which includes a kind of grass (roots intertwined) that grows to be 2 or 3 feet high, and requires the most persevering efforts to exterminate it.

COCOANUTS.

Many of the cocoanut trees have been planted on low grounds, and so thick in places that the leaves overlap, necessitating the removal of several hundred. The total amount of trees numbers 8,731, ranging in age from 2 months up to 50 years. Of these, 600 are of my own planting. There are 600 others less than 5 years old; 1,809 will be bearing in two years; 5,722 are now bearing. A portion of these are in excellent condition, while the remaining portion had to be severely pruned. It will take two years before the same excellent results are obtainable in the latter. In places the vines were so intertwined as to hold the nuts in their meshes until they sprouted and grew to a height of 5 or 6 feet. All trees on the south side of the River Sax have been thoroughly trimmed and cleared and the underbrush removed as well. There remain only about 300 trees on the north side that have not been thus cleared. Those on remote portions of the farm are to a certain extent destroyed by wild hogs and monkeys. The former destroy the fruit as it falls, and the latter destroy it in its immature state.

HEMP.

There are about 35 acres of hemp, quality good, bad, and indifferent. In many places there are whole acres with but few plants. A great portion of it has gone to seed and has, therefore, no commercial value, while a still larger portion is old and has no value except for planting. I have had 30,000 plants set out, some on new ground, the majority in places were choked out by the rank vegetation. All of the 35 acres have been thoroughly cleared once, and portions of it twice. It is now in fair condition, and as the rainy season has set in, a vigorous growth may be expected in the next few months. The best hemp grown is produced under a light shade, such as can be had by planting between rows of cocoanut trees. Even by the crude methods that here obtain, it is a valuable crop. I understand a machine has been invented to separate the fiber from the pulp. If so, it will lessen the cost of production at least 20 per cent.

CACAO.

One thousand and twelve cacao trees are in the same deplorable condition as the hemp and cocoanut, viz, the trees are loaded with dead fruit, leaves, and vines and the foliage covered with smut. Grass, weeds, etc., have been removed from the grounds and the trees cleared. Every pod on the 1,012 trees has been stung by an insect which deposits its egg or eggs; in the course of a few weeks a small white worm is developed that resembles the apple worm, except in size, being much smaller. It destroys every bean in the pod; the pod itself turns black and dries up. I am experimenting with night fires, hoping to attract the insects and thus exterminate at least a portion of them. The crop is a valuable one if it can be matured.

SUGAR CANE.

Three or four hundred acres were planted to sugar cane during the Spanish regimen. There can be sufficient seed gathered from the stubbles to plant at least 100 acres. Up to the present I have not done anything with it, but I fully expect to have a piece of ground prepared and planted, if to no other purpose than to preserve the seed, as in the course of a year there will be no trace of it left.

RICE.

A large area of the farm has been planted to rice, also under the Spanish régime. It is overrun with the aforementioned rank growth. Have not as yet had anything done with it.

MILLS.

The sawmill as it appears to a casual observer could be repaired at a nominal cost. On careful investigation, however, enacted by an engineer (Cunningham), it was found to be practically impossible to undertake repairs. It has been battered to pieces and to no other purpose, apparently, than to destroy. The boilers will not stand a pressure of more than 30 pounds to the square inch, which is wholly inadequate, and renders the boilers unsafe. I understand the quartermaster's department has taken all fittings with which to fit out the ice and condensing plant at Zamboanga. I have put under lock and key brass and other parts that could be disconnected as the natives have a mania for all things tenable. I have seen articles from the farm scattered from here to within a few miles of Zamboango, viz, lumber, corrugated iron, pulleys, belting, and anything and everything that pertains to the mill and farm.

SUGAR MILL.

The sugar mill is in even worse condition than the sawmill. The engineer, during the time the sawmill was in operation under military rule, took apart and changed all parts of the engine for use on said mill. The tanks have been removed and it is, all told, a total wreck, and would cost more to repair it than the price of a new and modern mill. I therefore recommend the disposal of the two mills as whole or in part in order to realize a goodly sum while it is yet possible, as in time it will only be good for scrap iron.

BUILDINGS.

There is one good house, built during the military régime, or partially built, and completed during the fiscal year. There are two houses that were built by the Spanish, also one barn and barracks. The two latter have been torn down and the available lumber used in the construction of a large building now going up—size, 26 by 120, all under one roof; 26 by 32 to be used as a storehouse, 20 by 26 as a toolhouse (for small tools); 20 by 26 for feed, and the remaining 48 feet for a barn, farming implements, etc. One house is yet to be built for the foreman; have had 2 nipa houses built for laborers and had 7 others put in good repair.

LABORERS.

The labor proposition is a serious one. The number of laborers is limited, due partially to the demand from the military government, which allows shorter hours and gives better pay. It has been demonstrated that the average Filipino will not work more than three days out of seven, so in order to have a force of 50 or 60 men it is necessary to have double the number on the pay roll. At present I have a much better class than when I commenced operations. In the course of time the proposition may have worked itself out.

FARMING IMPLEMENTS.

I am supplied with small tools of every description, with the exception of a very few, but there are no heavy implements, such as plows, cultivators, and harrows. I expect to put in a requisition in the near future for such as will be needed to do the work on a small scale. Any good steel plow could be used successfully in this soil. If we should decide to go into the sugar industry extensively, heavy machinery would be required.

BRIDGES.

The Spaniards had at least seven bridges. There is but one left, and this one I have kept in repair. Thus far there has been no actual need for more, but when the rainy season has fully set in we are likely to have some trouble in getting about.

STOCK.

I am thoroughly convinced that for various reasons the carabao can be used most successfully on the farm. First, the natives understand his use and uses; second, he requires no shoeing, he is a native of this country and thrives best on native productions; lastly, his harness costs but 15 or 20 cents, and if broken can easily be repaired with the bolo. The American horse or mule is susceptible to all kinds of diseases; a large per cent are especially subject to hoof diseases. Furthermore, it takes a year to acclimate them, and their use would necessitate the services of an American blacksmith and an American saddler. Feed is another subject for consideration. It has not been demonstrated that the country will produce oats or barley, and the horse, unlike the carabao, can not work every day and thrive on grass. There is, perhaps, little doubt about raising plenty of forage, but there would be difficulty in curing it on account of so much rain and consequent moisture.

VEGETABLES.

I have done nothing as yet in the growing of vegetables. Was unprepared at the time of my arrival, and shortly thereafter the dry season was upon us. I have selected a piece of ground which I will have cleared and which can be irrigated if need be.

TRANSPORTATION.

This is a vexing problem. It is 15 miles to Zamboanga, with no other means of transportation than a small native boat which will not carry supplies and products except to a very limited extent. There is no road to Zamboanga, and in the stormy season a small boat is unsafe. An American sailboat, with a keel or centerboard, arranged for tacking, and with a capacity of, say, 5 or 6 tons, would improve the conditions materially.

Cost of operating from December 1, 1901, to June 30, 1902.

Salaries and wages:	
December	$217.75
January	498.07
February	558.77
March	479.69
April	497.28
May	599.30
June	622.975
Total, U. S. currency	3,473.835
Contingent expenses:	
December	1,633.72
January	26.88
February	24.30
March	15.09
April	None.
May	80.98
June	8.10
Total, U. S. currency	1,789.07

Have not received general expense voucher for supplies shipped from Manila to Zamboanga. Have paid $3 for transportation from Zamboanga to the farm.

Respectfully submitted.

George M. Havice,
Superintendent Government Farm, San Ramon, Zamboanga, P. I.

July 15, 1902.

EXHIBIT L.

REPORT ON THE GOVERNMENT EXPERIMENT STATION AT ALBAY.

MANILA, P. I., *December 13, 1901.*

SIR: In accordance with the instructions contained in your letter of November 30, I visited the government experiment station at Albay, situated about 1 mile from Albay and 3 miles from Legaspi, and beg to submit the following report:

(1) There are no buildings on the farm.

(2) The farm contains 9 hectares of land, and was formerly inclosed by a barbed-wire fence, the corner posts of which can still be seen, showing the boundary line as given in the map. It is a flat, level piece of country, and the soil is a rich sandy loam, chiefly composed of volcanic ash. At present the entire farm is covered with grass, and the only crops grown in past years, according to information given by a former employee, were rice and sugar cane. Rice, sugar cane, corn, hemp, cocoanut, coffee, tropical fruits, and vegetables should grow well on this land.

(3) It is well watered, and a river runs within 200 yards, from which irrigation can be carried to all parts of the farm during the entire year.

(4) No crops are raised on the farm at present.

None of the land in the vicinity of Legaspi and Albay is cultivated, the entire energy of the inhabitants being given over to the raising of hemp, at which they make from 2 to 4 pesos per day preparing the hemp for market on half shares at the present prices. There are two pieces of land in the town of Albay formerly used as gardens, but now overgrown with grass, which belong to the provincial government, besides the remains of a number of buildings.

In sending vegetable and garden seeds to the provinces for experimental cultivation, I would suggest that full directions accompany each variety, giving in detail the proper method of preparing the ground and time of sowing. The natives are very ignorant (and sometimes the Americans) of the proper method of cultivating the ground and planting the seed, generally putting the seed in a hole in the ground, sometimes before a heavy rain, which washes the seed away. Then, if the seed does not grow within a reasonable time, the planter usually decides the land will not grow that particular variety.

Trusting the above report will meet with your approval, I am, sir,

Very respectfully,

M. R HEALY.

Time of trip:	Days.
Manila to Legaspi	5
At Legaspi	3½
Legaspi to Manila	2½
Total	11

Hon. DEAN C. WORCESTER,
Secretary of the Interior.

EXHIBIT M.

REPORT ON THE GOVERNMENT EXPERIMENT STATION AT ILOILO.

MANILA, P. I., *January 9, 1902.*

SIR: Acting under instructions contained in your letter of December 5, 1901, I visited the government experiment station at Iloilo, and report as follows:

(1) There are no buildings on the property, except the brick foundations of what was once a sugar mill.

(2) The station contains about 20 acres of level land raised about 8 feet above the sea level. The boundaries are well marked by a line of cocoanut trees, which extends around the farm. The farm is L-shaped, the long L running toward the north and the short L toward the east. The soil is a rich clay with a depth of about 6 feet, and should grow nearly every crop that can be raised in these islands—rice, sugar, hemp, corn, coffee, bananas, cocoanut, cacao, maize, alfalfa, oats, and all kinds of vegetables and fruits. I would recommend that American vegetables and fruit be experimented with on this farm, as the soil is well adapted for the purpose.

(3) A large river runs on two sides of the farm from which water for irrigation can be taken the entire year.

(4) The presidente of Lapas is raising rice on about 3 acres of the farm for the poor on the written authority of the military governor, General Hughes.

This farm is situated on the outskirts of Iloilo, not more than fifteen minutes' drive from the center of the town.

Trusting the above report will meet your approval, I am, sir,

Very respectfully,

M. R. HEALY.

Hon. DEAN C. WORCESTER,
Secretary of the Interior.

EXHIBIT N.

REPORT ON THE GOVERNMENT EXPERIMENT STATION IN THE PROVINCE OF ISABELA.

MANILA, P. I., *February 12, 1902.*

SIR: Acting under instructions contained in your letter of December 5, 1901, I visited the government experiment station in the province of Isabela, and found it located about 5 miles from Ilagan on the road to San Antoine. I report the following conditions:

(1) There are no buildings on the farm.

(2) The experiment station contains 40 hectares of level land, bounded on the north by vacant land, on the east by the Comunatan Ranch, on the south by the Malalang Ranch, and on the west by the Guenatan Ranch. It is at present uncultivated, covered with grass and about one-tenth of it with brush. The soil is stiff clay with a little sand, and the subsoil is a very stiff clay. Tobacco is a favorite crop of the valley, but rice, cacao, hemp, coffee, cocoanut, corn, oats, barley, wheat, alfalfa, timothy, and rye grasses should grow well here, also all kinds of vegetables.

(3) The farm is under water during the very heavy floods of the rainy reason, and irrigation can be carried on at other times as the river runs within one-fourth of a mile of the farm.

(4) No crops are raised on the farm at present. This farm can be increased in area to about 500 hectares, or perhaps more, as the adjoining land is vacant and presumably belongs to the government. Should a more desirable location be required on account of the flooding of this farm at high water, other and perhaps more suitable lands can be easily obtained in other parts of the valley, not more than one acre in fifty of the entire valley being under cultivation.

Very respectfully,

M. R. HEALY.

Hon. DEAN C. WORCESTER,
Secretary of the Interior, P. I.

EXHIBIT O.

REPORT ON THE EXPERIMENT STATION AT CEBU.

MANILA, P. I., *February 27, 1902.*

SIR: Acting under instructions contained in your letter of the 13th instant I visited Cebu and found that the experiment station in that province originally consisted of 11 hectares obtained from the padres of the seminary in Cebu in exchange for the permission to fill in the seashore in front of their seminary, the land thus filled in being known as the Terreplane. The experimental station, containing 11 hectares, was situated in the township of Mandane, about 5 miles from Cebu, and was divided into two nearly equal parts by a road running north and south through the center of the property. In 1895 the eastern half of the property was exchanged for a piece of land in Guadalupe, township of San Nicolas, of equal area, by the superintendent then in charge. The exchange was made with Don Isidro Gimilondo y Tagle, who afterwards sold his half of the Mandane property to Pietro Valosa, in whose name it now stands. This leaves about 5½ hectares in the township of Mandane and about the same area in the township of San Nicolas.

In addition to the above land the presidente of Mobolo, near Cebu, on the road to Mandane, informed me that the superintendent of the experimental station leased for two years about 5 hectares of land in his township for the government, but I found no record in Cebu of this transaction. The ground is at present claimed by Señora Ventura Valosa.

The following machinery is held by Mr. Holcomb, the supervisor at Cebu, for the experiment station: One combined seeding and drilling maching, 1 rice huller, 4 single wood plows, 1 iron harrow, 1 oat crusher, 1 grass cutter, 1 winnowing machine, 1 corn grinder, 1 iron drill machine. This machinery is heavy, old-fashioned, and in very bad repair.

The experiment station at Mandane is about 5 miles from Cebu and contains 5½ hectares to the west of the road and the south of the Bupuanon River, and consists of one field clearly marked with a fence. There are at present about 2 acres of sugar cane on this land, the rest is plowed, but no crop has yet been sown. The only building on the land is a native shack used by Eustaquio Cortez, treasurer of Mandane, and Narcisco Cabajog, under verbal authority from the municipality of Mandane. The soil is a poor quality of clay, and seems to be well used up, as the crop of sugar cane at present on the land is very small and light. Sugar, rice, corn, oats, alfalfa, tobacco, hemp, cacao, cocoanut, bananas, fruits, and most of the vegetables should grow here. A river runs on the north side of the land, from which irrigation can be carried on for the greater portion of the year. There are about 2 acres of sugar on the land owned by Eustaquio Cortez and Narcisco Cabajog, who claim to have rented the property from the municipality of Mandane for the past three years at 150 pesos per annum, payable monthly. They have no receipts for the payment of this money, and the treasurer of Mandane has kept no cash book.

The one-half of the orginal experiment station to the east of the road is at present owned by Pietro Valosa, but Narcisco Cabajog, one of the men who has leased the other half of the property, has arranged to purchase the ground from Pietro Valosa. There is a small native building on the land covering a small hand-power sugar mill, with four small vats, such as are common to the country. There is a crop of sugar cane on the land, very poor and light in quality.

The other land belonging to the experiment station is situated in the township of San Nicolas, about 2 miles from Cebu.

(1) There are no buildings on the ground now. Formerly it had a camarine or storehouse and a hothouse or nursery, the superintendent living in Cebu.

(2) This farm contains about 13 acres of flat land in one field, well marked by a cocoanut tree and stake fence, and bounded on the east by the Guadaloupe River. It is at present under grass. The soil is a clay loam, and should produce rice, sugar, hemp, tobacco, cacao, banana, pineapple, coffee, cocoanut, corn, oats, alfalfa, fruits, and vegetables in abundance.

(3) The Guadaloupe River has water only during the rainy season, but there is a well about 25 feet deep in the southeast corner of the farm from which irrigation can be carried on during the entire year.

(4) There are no crops raised on the farm at present.

The experiment station at present consists of two farms, one at Mandane and one at San Nicolas, the land at San Nicolas being much richer soil than at Mandane. It would, perhaps, be advisable to exchange the Mandane land for some adjoining the land in San Nicolas.

Very respectfully,

M. R. Healy.

Hon. Dean C. Worcester,
Secretary of the Interior.

Exhibit P.

REPORT BY THE BOTANIST ON AN OVERLAND TRIP FROM MANILA TO APARRI.

Manila, P. I., *July 8, 1902.*

Sir: I submit herewith a report on the results of a trip overland from Manila to Aparri, accomplished between the dates May 22 and June 29, 1902, under your letter of authorization dated May 21, 1902.

Very respectfully,

Elmer D. Merrill,
Botanist.

Prof. F. Lamson-Scribner,
Chief Insular Bureau of Agriculture, Manila, P. I.

ITINERARY, CONDITION, AND QUESTION OF TRANSPORTATION.

Accompanied by Mr. G. D. Brill, superintendent of agricultural education in the department of public instruction, I left Manila at 7 a. m. May 22, 1902, on the Manila and Dagupan Railroad for Bautista, arriving there at 4.30 p. m., where we remained overnight at the army barracks. From Bautista to San Jose, via Rosales and Humingan, a distance of 45 miles, we traveled by army mule wagons. At Huminigan an attempt was made to secure native transportation, but they were exorbitant in their charges, demanding $7 gold for transportation by carromato from Huminigan to San Jose, 15 miles, and, accordingly, as there was an army mule team going over that afternoon we waited for that, finding by experience later that transportation by mule team is the quickest and surest method in the provinces.

The trail from San Jose to Carrangalang, a distance of 24 miles, is exceedingly rough, and the only transportation we could secure was a carabao cart for our luggage, being obliged to walk the entire distance. Early on the morning of May 27 we applied to the presidente of Carrangalang in order to secure transportation to Dupax, the next town, 36 miles distant. We wished to get three ponies, but at 6 p. m. he had secured but one, and not wishing to delay any longer, we used the pony to pack our baggage and walked to Dupax. From Dupax we went to Bayombong, via Bambang, arriving in Bayombong early May 30. On account of heavy rains and consequently swollen streams we were delayed here several days.

On June 4 we started for Quiangan, 50 miles, returning to Bayombong June 8 being obliged to walk the entire distance, and on June 9 we left Bayombong for Bagabag and on the following day continued onward toward the Cagayan River, arriving in Cordon June 11, and Cauayan, on the Cagayan River, the following day.

On June 13 we started down the river on a barangay and were five days in reaching Tuguegarao, making stops at Naguilian, Iligan, Tumauini, and Santa Maria. From Tuguegarao we went to Lol-loc on the tobacco company's steamer *Magapit*, and from Lol-loc to Aparri on the United States quartermaster's launch, arriving at midnight June 19. Here we were obliged to wait four days for a steamboat, and on June 24 we left for Manila on the transport *Buen Viaje*, arriving in Manila June 29, making stops en route at Salamogue, San Esteban, San Fernando, and Iba.

From Bautista to San Jose there is a good military road. From San Jose to Carrangalang there is an exceedingly rough road, passable by carabao cart; but, as in several places it follows the bed of a large river which it is necessary to ford many times, it is impassable during the rainy season.

The trail from Carrangalang to Dupax is impassable for wagons at all seasons, and impassable by any means during the season of heavy rains. This trail is most difficult, especially the pass over Caraballo Sur, which is about 2,500 feet above the valley. All supplies or baggage must be packed over on ponies or carabao. In Nueva Vizcaya, between the towns of Dupax, Aritao, Bambang, Bayombong, Solano, and Bagabag, there are good roads; but in all other parts of the province there are only trails and footpaths. From Bagabag to Cordon, in Isabela, there is a very difficult trail, impassable for wagons at all seasons. Consequently all supplies not produced in the provfnce must be brought in by pack train, as there are no roads leading into the province.

From Cordon to Echague a road exists, but at present it is in very poor condition, while from Echague to Cauayan there is a very fine military road. Between most of the towns on the Cagayan River, in the provinces of Isabela and Cagayan, roads exist, but from Cauayan, the head of navigation for bancas and barangays northward, most traffic and intercourse is by the river. Under most favorable conditions one can travel from Cauayan to Aparri by barangay in about two days; that is, with the river high, no head wind, a light load, and a through trip. Ordinarily, however, one must count on from five to seven days to make the trip, and, moreover, he may be obliged to wait several days for a boat. Traveling up the river by boat is exceedingly slow, and it frequently takes fifteen or twenty days or even a month to go from Aparri to Cauayan. Information as to the movements of the barangays can be obtained from the presidentes of the various towns, as the captain of each barangay is obliged to register at the presidencia of each town where a stop is made.

During periods of very low water it is difficult for barangays to travel either up or down stream in the upper reaches of the river, and frequently, under these conditions, one may be delayed several days by the boat getting stranded on bars or snags and be obliged to wait for a rise in the river to float the boat off. Under favorable conditions the river steamers *Raleigh* and *Aparri* ascend as far as Cauayan, but no dependence can be placed on the movements of these boats. During the period of very high water there is no traffic on the river, as it is unsafe to navigate.

Throughout our itenerary ponies and carabao were comparatively scarce and high priced, due not only to the great destruction of stock during the insurrection, but also to the recent ravages of glanders and surra among the horses and rinderpest among the carabao and cattle. In some localities bullocks were used as draft animals, almost to the exclusion of the carabao.

GENERAL FEATURES OF THE COUNTRY.

From Manila to Bautista, along the Dagupan Railroad, the country is mostly very level, the staple crops, so far as we could judge from the train, being rice and sugar cane. Extensive areas were occupied exclusively by the coarse grass known as "cogon," and in some places extensive forests were observed, although along the railroad the timber of the better classes has all been cut.

From Bautista to San Jose the country was much the same as along the railroad and the same crops are cultivated. As one approaches San Jose the country becomes more hilly and rolling, about one-half the area being forested, the other half being covered with coarse grasses with an admixture of finer sorts, the military road paralleling the foothills, which, like the mountains, were densely forested.

From San Jose to Carrangalang, Pangasinan, and Nueva Ecija the trail at first leads through a rough, densely forested country, but soon one comes out into open, rolling country, the hills being densely covered with magnificent grazing grasses, the ravines, higher hills, and surrounding mountains being densely forested. The country is well watered with numerous small clear streams, one being found in every little valley. Between San Jose and Carrangalang, and from the latter place northward toward the mountains, and probably also in other directions from that town, there are hundreds of thousands of acres of these grazing lands entirely unutilized. Between Carrangalang and Dupax, Nueva Vizcaya, the trail passes over densely forested mountains, Caraballo Sur, but once over the range one comes into the valley of the Magat River, and here on a much more extensive scale are repeated the grazing lands, similar to and even better than those in Nueva Ecija, in the river valley, over the foothills, everywhere throughout the province.

Nueva Vizcaya is a very rough, mountainous province and contains but six incorporated towns, although there are many Igorrote "rancherias" scattered about in the mountains. No roads passable by wagon lead into the province, although mostly good roads exist between the towns which are situated in the river valley. I believe the future development of this province lies in the cattle industry and, in case the question of accessibility is settled by good wagon roads or a railroad, vegetables could be raised for the Manila market, as many kinds of fruit and vegetables thrive there.

At present rice is the only crop raised for export from the province. Large quantities of this are yearly shipped into Isabela Province, the means of transportation being entirely by pack horses over an exceedingly rough trail, the distance from Bagabag, the last town in Nueva Vizcaya, to Carig in Isabela, being about 25 miles, or often the rice is packed through to Cauayan, about 50 miles from Bagabag. Cacào, coffee, potatoes, camotes, gourds, cocoanuts, areca nuts, bananas, plantains, tomatoes, corn, peppers, beans, tobacco, etc., are raised, entirely, however, for home consumption. At Bayombong Señor Valera furnished us with a magnificent watermelon, grown from American seed, and in his garden he had growing also oats, carrots, beets, and cabbage from American seed furnished him by an army officer, and he appeared to take much interest in his garden.

The trail from Nueva Vizcaya into Isabela leads over foothills and mountains, mostly magnificent grazing lands, and then into the broad valley of the Cagayan, with its thousands of acres of grazing lands, in many respects superior to those of Nueva Vizcaya, as the whole valley is level, and from 60 to 100 miles wide, well watered and timbered.

In Isabela practically the only crops raised are tobacco and corn, with comparatively little rice, and this also applies to the province of Cagayan to the north, the natives finding it less work to raise tobacco, and so securing money enough to purchase what rice they need than to raise the rice themselves, although there is an abundance of good rice lands in the valley.

GRAZING LANDS AND CATTLE INDUSTRY.

As mentioned above, most magnificent grazing lands exist in eastern Pangasinan, northern Nueva Ecija, Nueva Vizcaya, Isabela, and Cagayan, probably also in the other provinces, mostly rolling uplands in the three former provinces, and broad, level prairie lands in the two latter, although so far as abundance and quality of the grasses are concerned there is apparently no difference, the same species growing on the prairies as on the hills. These grasses consist of one or two species of *Panicum* and

Eragrostis, and many representatives of several genera of the *Andropogonæ*, all fine-stemmed, fine-leaved grasses, which, in the United States, would be popularly known as "bunch" grasses, as they mostly grow in small tufts, not being true turf-forming grasses, yet there is a sufficient abundance of turf-forming or partially turf-forming grasses so that, notwithstanding the heavy tropical rains to which this region is subject during several months of the year, so close is the turf that absolutely no signs of gullying or washing were observed even on the very steep hillsides, except along the trails where the turf had been first broken by horses and carabaos, which shows what may be expected if cattle are ever introduced here in abundance. Near the streams and in the river valleys, about rice paddies, etc., Bermuda grass (*Cynodon dactylon*) is abundant, and as one approaches the coast Korean lawn grass (*Osterdammia matrella*) is found everywhere. This species can, however, be of little value for grazing. Near the rivers and in some of the ravines and small valleys great, coarse, reed-like grasses, 10 to 15 feet in height, are abundant; but these coarse grasses occupy but a comparatively small per cent of the total area.

The grazing lands in eastern Pangasinan, northern Nueva Ecija, and throughout Nueva Vizcaya are characterized by their hilly, rolling character, the ravines and small valleys, tops of the higher hills and surrounding mountains being densely forested, while in every small valley one finds streams of clear, pure water, it being impossible to travel more than 3 or 4 miles in any direction without finding good water. Hence, it will be observed, that there is an abundance of feed, water, and shelter, the requisites for an ideal cattle country; and especially to be noted here are the topographical features of the country, which, in case of epidemics of rinderpest, are of especial value, as in these valleys whole herds of cattle can be isolated and, with a little care and watchfulness, guarded for months against infection by contact or through the water supply.

The water supply is especially to be noted, as in the numerous mountain streams the water is perfectly pure and as clear as crystal except immediately following a heavy rain. These streams, during the rainy seasons, like the great rivers, are subject to great and sudden rise and fall, and from a quiet babbling brook one may change in a few minutes into a raging mountain torrent; yet where the mountains are heavily timbered the rise and fall are more gradual and do not go to extremes.

The grazing lands of Isabela and Cagayan differ from the above in being almost perfectly level, or but gently rolling, typical prairie lands extending almost as far as one can see in all directions, limited by the coast range on the east and the great central range on the west, and extending from some distance south of Cordon north to the coast. The same species of grasses are found here as in the ranges of Nueva Ecija and Nueva Vizcaya, and the quantity and quality are about the same. This great valley consists of open country with isolated trees, or sometimes small groves, with more or less forest land along the streams. The country is well watered by the numerous tributaries to the Cagayan River. In this valley the unbroken ranges are far more extensive than in the mountain regions, but, at the same time, in case of an epidemic of rinderpest, there is not the same opportunity of isolation as a means of protection against the disease.

Accessibility.—For nearness to the Manila market the ranges in eastern Pangasinan and northern Nueva Ecija are most advantageously situated, as cattle can be driven to the railroad at Bautista or San Fernando, or, for that matter, the entire distance to Manila. Nueva Vizcaya is more isolated, but cattle can be brought out over Caraballo Sur and so to market, the same as those from Nueva Ecija. Cattle raised in Isabela or Cagayan would probably be better driven down to Aparri, and from there taken to Manila by boat.

Present scarcity of cattle.—From inquiries made along the route I learned that the cattle industry was at one time quite prominent in Nueva Vizcaya, and especially so in Isabela; but, due to the insurrection and recent ravages of rinderpest, the herds have been much depleted or entirely exterminated. In Nueva Vizcaya I saw only about 12 head of cattle, but they were in magnificent condition. In Isabela I saw but two herds—one of about 12 head and one of about 25—in the neighborhood of Carig, and, like those in Nueva Vizcaya, they were in excellent condition. At Tuguegarao I saw a herd of 60 head, but they had been shipped to Aparri from one of the small islands off the northern coast of Luzon and driven up the valley. The cattle were all of the Chinese or Indian type and every one observed was in magnificent condition.

In Pangasinan, Ilocos Sur, and Zambales bullocks were extensively used as beasts of burden, attached to carts or sometimes to carromatas, in some towns being used almost to the exclusion of the carabao. None of these "trotting bulls" were observed in Nueva Vizcaya, Isabela, or Cagayan.

Disadvantages.—The greatest disadvantage of entering into the cattle business is, I believe, the prevalence of rinderpest, which, however, can be more or less guarded against by inoculation, and especially by isolation, and for the latter method northern Nueva Ecija and Nueva Vizcaya are especially adapted. When herds are grazed in the mountain regions more or less trouble is to be expected from the Igorrotes and other mountain tribes, as even now in Nueva Vizcaya they venture down to the valleys and drive off carabao occasionally. However, with the gradual pacification of the country and the more efficient organization of the native coustabulary, no trouble will be had from this source.

Cattle raising for the home market should be a very profitable undertaking in northern Luzon, if one can judge by the prevailing high prices of meat in Manila, and the fact that practically all the meat consumed is shipped in on the hoof from Singapore, or as refrigerated meat from Australia and the United States. Certainly the conditions in Luzon are ideal for this industry, and the grazing lands of the island can not be surpassed by any in the world and certainly not equaled by 99 per cent of the grazing lands in the United States. Hundreds of acres of these open ranges in some sections would produce a great abundance of native hay, aud once the question of transportation is solved the Manila market could be cheaply and easily supplied with thousands of tons of native hay, as in many sections, under natural conditions, there would be a heavy yield of hay per acre of fine quality, the natural lay and condition of the land being such that cutting and harvesting could be done by machine. At present the thousands of tons of hay needed in these islands for the support of native ponies, and especially for United States army horses and mules, is imported from the United States and Australia.

Fires on the grazing lands.—Whether the open range is in the hills in Nueva Vizcaya or on the prairies of Isabela, it is burned over periodically, mostly from fires set accidentally by native camp fires or cigarette or cigar stubs thrown into the dry grass, or purposely set in order that the native may enjoy the sight. On the trip from Bagabag to Quiangan I twice saw members of the constabulary force deliberately set fire to the grass along the trail, after lighting a cigar or cigarette, watch the resulting fire a few minutes, and then go on. So far as the value of the land is concerned for grazing purposes, these fires are useful rather than harmful, as they clear away the mass of dead stems and leaves, the result of several years' growth and decay, and immediately after a fire the grass springs up again fresh and green. One peculiarity noticed was that these fires, even on the level prairies of Isabela, never burn over large areas, a few hundred acres at most. Sometimes they are limited by the topography of the country, and again the fire reaches the border of a "burn" which took place within a year or two, and, finding no dry material, it burns itself out.

Effect on the forests.—On the forests, however, these fires have a very different effect, as they tend not only to restrict the forests to their present area, but even to reduce that area.

In this country it should be remembered that the mountains, the higher hilltops, and most of the gullies are more or less densely forested, while the most of the hills are covered with grass. The tendency to reduce the area of the forests is brought about in this manner: A fire is started on a hillside and rapidly spreads, usually both down into the ravine and also toward the summit. It very often happens that one at least, or more often both the ravine and summit are forested. The fire reaches the margin of the forest, burns fiercely a few minutes on the taller grass, underbrush, and debris always found at the margin of a wood, and then gradually dies out, having killed most of the smaller trees and underbrush at the margin of the forest. In two or three years the hillside again becomes densely covered with dead grass, and now if another fire occurs, when it reaches the margin of the wood it not only finds the usual amount of tall dead grasses, underbrush, etc., but also the dead bushes, small trees, etc., killed by the fire of a few seasons past, and this additional fuel aids it to push the margin of the forest still farther back. Such fires, constantly recurring, not only hold the forest in check, but actually decreases its area.

In another manner these fires also check the forests. I observed that in numerous ravines and small valleys often quite a little forest had started, gradually extending up the slopes on either side. If a fire sweeps through this valley or ravine in the first few years of the growth of this embryo forest, it will be utterly destroyed.

Throughout Nueva Vizcaya there were constantly recurring examples of both cases cited above, and I believe that if these grass fires could be eliminated eventually the entire area now occupied by the grass-covered hills would become covered with forests.

OTHER STOCK.

Carabao.—This universal beast of burden was seen everywhere, but it was the common statement that there had been great loss among the carabao, due to the ravages of rinderpest during the past year or two, and that they were difficult to secure and high in price.

Ponies.—The native pony is in most localities of very inferior quality. No care or selection is exercised in breeding, and the animals are worked when very young and receive miserable care. As a result the tendency is for the ponies to be undersized and not particularly strong. It was very rare, indeed, to find a pony that did not show saddle sores or scars to a greater or less degree. The number of ponies has in the past few years been greatly depleted by ravages of surra and glanders.

Sheep.—At several places in Pangasinan, Nueva Ecija, Cagayan, Ilocos Norte, and Zambales sheep were observed; in no case more than 8 or 10 in a flock. So far as I could learn, they were only raised for mutton. All observed were of a variety with a brownish fleece, and appeared to be in good condition.

Goats.—While not abundant, goats were observed in nearly every town visited. They are raised only for their flesh.

Pigs, *chickens*, *ducks*, and *pigeons* are too well known in the Philippines to require discussion. At several places turkeys and geese were observed.

LOCUSTS.

At several places on the trip enormous flights of locusts were observed; in Tarlac Province, along the railroad; near Huminigan, Pangasinan, north of Carrangalang, Nueva Ecija; in several places in Nueva Vizcaya; at Cordon, Echague, Cauayan and Santa Maria, Isabela, and at Aparri in Cagayan. Swarms in several stages of development were observed, and the number of individuals was almost beyond comprehension. In many places they were so numerous that in attempting to take flight they would beat each other down with their wings. In many places they appeared like great clouds, and the whirr of their wings sounded like the rushing noise of a high wind. In spite of the great number of these insects, nowhere did I observe any space denuded of vegetation, they apparently not remaining long in one place. At Cordon fear was expressed that they might cause a failure of the rice crop by eating the seedling leaves as they come up through the ground. These locusts are captured by the natives by means of nets, and are extensively used as food, being found on sale in all the markets, even in the city of Manila.

CROPS.

Rice.—This is the staple crop and was cultivated in most localities visited on the trip. Methods of cultivation are very crude and, with the exception of lands cultivated by the Igorrotes, but one crop is produced in a year, and that is grown during the rainy season. The land is allowed to remain idle during the dry season, being occupied by weeds, Bermuda grass, etc. When the rains commence the water is allowed to stand in the paddies, and when the ground becomes thoroughly saturated with water, it is plowed, carabaos being the draft animals used. The plows are very crude, being only a forked stick to which is attached a cast-iron point. The first plowing simply scratches the sod; the second, at right angles to the first, breaks it still more, and after plowing several times, the land is harrowed with a bamboo harrow, this implement being constructed of the larger basal joints of a species of bamboo which has numerous stout branches at each node, these branches being cut off 10 or 12 inches from the joint and the several pieces of bamboo lashed together with rattan.

The rice is first propagated in specially prepared paddies, and from these it is transplanted to the paddies in which it is to be grown, a few young plants being thrust into a hole made in the soil and the earth then slightly packed around the plants, which are planted a foot or two apart each way, all this work being done by hand.

Little information was secured regarding methods of harvesting, but all this work is done by hand, the heads being gathered individually and tied into bundles, then known as "palay." Much rice is bought and sold as "palay"—that is, unhulled—especially in towns where there are large rice warehouses and rice-hulling machinery, as is the case in several towns along the railroad. Practically all the rice for local use, however, is hulled by hand by pounding the palay in great mortars, this work being done mostly by the women of the household, who pound out what is needed for food day by day, or, at most, an amount that will last for a week or two.

In and about Quiangan, Nueva Vizcaya, the Igorrotes, by artificial irrigation, produce two crops each year, their rice being of superior quality, with larger, practically awnless heads and larger grains than that seen elsewhere. At the time of our visit, early in June, they were just commencing to harvest the first crop.

In Isabela very little rice is grown, everything being sacrificed to the culture of tobacco and some corn. Most of the rice consumed there is raised in Nueva Vizcaya and packed from 35 to 60 miles on ponies over a very difficult trail.

As our trip was made at the close of the dry season, we had little opportunity to observe the cultivation of this crop, as, with the exception of Iba, Zambales, and at Quiangan, noted above, work in preparing the soil had not commenced.

In many parts of the provinces, especially along the railroad and in Pangasinan and Nueva Ecija, great tracts of rice land were out of cultivation and evidently had not been cultivated for several years, chiefly because of the insurrection, although, in some cases, because of the loss of carabaos, there being no draft animals with which to work the land.

Sugar.—This crop is raised to quite an extent along the Dagupan railroad, but methods of extracting the sugar are very crude. The common method of crushing the cane is as follows: Two, or at most three, rollers of stone, or sometimes of wood, are arranged in a vertical position, with interlocking cogs, and to one is attached a long horizontal bar, motive power being supplied by a carabao attached to the distal end of the bar and driven about in a circle, the cane being thrust between the rollers by hand. These rollers are placed on a cement or wooden base, with a series of channels for collecting the extracted juice, which is drawn off into large earthen crocks and reduced to sirup over an open fire. Throughout the provinces, and even in Quiangan, small amounts of cane are grown for local use, although in many cases I believe no attempt is made to extract the sugar.

Tobacco.—Throughout the provinces this plant is grown for local use, but in the provinces of Isabela and Cagayan it is the only commercial crop raised, and here, especially in the former province, is grown the best tobacco produced in these islands and practically all the tobacco manufactured for local consumption in Manila and for export. The best tobacco lands are situated along the rivers, in those localities subject to overflow during the period of high water, and these lands are largely owned or controlled by the Compañía General de Tabacos de Filipinas and by the friars, being leased to the natives for the sole purpose of growing tobacco.

The best tobacco lands are those in immediate proximity to the river, and tobacco is even grown far down toward the low-water limits, and during our trip down the Cagayan we saw many such tobacco fields in which the crop was entirely ruined in the unexpected flood of early June. Tobacco is rarely grown more than 2 or 3 miles back from the river, but whether because of the condition of the soil or because of the question of transportation, I could not ascertain.

In the cultivation of tobacco, after the plant is once started, it is given pratically no care more than to go through the fields occasionally and destroy the insect pests. The tops are never cut nor are the buds removed from the axils of the leaves, the plant being allowed to produce flowers and fruit.

The leaves are picked, strung on sticks, and hung under curing sheds to dry. After the proper length of time they are roughly assorted and tied in bundles of 100 leaves each, which are then packed in bales of several hundred pounds each and shipped down river on bancas or barangays to Aparri and from there to the Manila market.

The excellent quality of the Isabela tobacco is evidently due entirely to conditions of soil and climate, and the application of scientific methods of growing the plants and gathering and curing the leaves should produce a tobacco equal or superior to that of Sumatra.

After the leaves are gathered the stalks are cut, the ground again plowed, and a crop of corn raised during the rainy season; that is, on those lands not subject to overflow for any length of time.

Corn.—This crop is raised more or less throughout the country traversed, but not in commercial quantities except in Isabela and Cagayan, where it is raised as a second crop on tobacco lands. It is used as food not only by the natives, but also for ponies, carabao, hogs, etc.

Forage plants.—No grasses or other plants are raised for forage, not even the *Eriochloa*, known as "Zacate," so extensively cultivated about Manila. At one or two towns where U. S. cavalry were stationed I saw natives bringing in bundles of Bermuda grass (*Cynodon dactylon*), presumably as food for cavalry horses. The abundance of natural forage everywhere about the towns does away with the necessity of cultivating grasses for this purpose. For graining horses the natives use palay—that is, unhulled rice—and sometimes corn. Palay is used for cavalry horses, but the food for these is largely baled hay and oats imported from the United States. At Bayombong Señor Valera had a small plot of oats which were started from American seeds, but they were in poor condition, and it is very doubtful if they can be raised in these islands.

Oats.—(See above.)

Coffee.—This crop is grown only for home consumption. In Nueva Vizcaya we observed magnificent specimens, thickly set with berries, even where growing in the open with little or no shade. Nueva Vizcaya is certainly adapted to this crop. Under present conditions one finds only a few bushes about nearly every house, but no extensive plantations.

Cacao.—Like coffee, this plant is grown only for local use, but it was observed in nearly every town visited.

Cocoa and areca palms.—These palms are to be found in nearly every town, but are grown only for local use.

Mango, jackfruit, chico, bananas, plantains and other native fruits are to be found in all the towns in quantities sufficient only for local use.

Rattans are common in the forests, but evidently at present no commercial advantage is taken of this fact. Eventually, I believe, considerable trade will be developed in this valuable plant as the supply now scarcely equals the demand, which is steadily increasing. No manila hemp is produced in the localities visited.

Potatoes.—This crop is grown only by the Igorrotes at their rancherias in the mountains, and is brought by them to the markets in the various towns. The tubers are very small and of inferior quality.

Camotes, or sweet potatoes, are also grown in many localities, but they are of inferior quality.

Cabbage.—Grown only by the Igorrotes, the heads being small, but of excellent flavor.

Carrots.—Señor Valera had growing in his garden at Bayombong carrots of very good quality from American seeds.

Beets.—With the carrots, but with a tendency to become woody; from American seed.

Watermelon.—At Bayombong I enjoyed a magnificent watermelon, grown from American seed, by Señor Valera. The native watermelon is small, with a tendency to be pulpy and of an inferior flavor. Several other species of the Cucurbitaceæ are grown, including several varieties of gourds, squash, and pumpkins.

Tomatoes.—These are to be found everywhere, but the fruit is mostly very small, often no larger than English cherries. I saw none over 2 inches in diameter.

Several varieties of beans, peppers, etc., are grown, and many of the native plants are cooked as greens.

AGRICULTURE AMONG THE IGORROTES.

During our stay at Quiangan we had abundant opportunity to observe the methods of agriculture pursued by these people. Rice is the staple crop, but corn, potatoes, cabbage, camotes, beans, tomatoes, gourds, etc., are raised. Their system of agriculture is the most careful observed in the island, the ground being carefully prepared and kept scrupulously free from weeds during the growing season.

The Igorrote uses no beast of burden, carabao and ponies being valued only as food. Pigs and chickens are raised, however. All the work is done by hand, the enormous system of rice paddies, extending for 2 or 3 miles up the steep mountain sides, on all sides of Quiangan, being evidently the results of the work of generations of these people, their only agricultural implements being a bolo and a heavy wooden shovel, the blade of which is about 8 inches wide. All these rice paddies are irrigated by utilizing the mountain streams, two crops of rice being produced each year, the rice being of superior quality to that grown down in the valleys by the Ilocanos and Tagalogs. For guarding against the heavy rains of the wet season, they have an ingenious method of sluiceways to carry off the surplus water. Often the terrace banks will be 8 or 10 feet high, and many of the terraces are no more than 1 yard in width, the average size of the paddies being very small. They are very similar to those in the mountains of Ceylon, in the neighborhood of Kandy.

The Igorrotes value seeds of new plants very highly, and would certainly make good use of any that might be sent them. They now raise potatoes and other vegetables in considerable quantities, which they offer for sale in the various market towns in the valleys. In the opinion of Governor Ney, of Nueva Vizcaya, the one method that would be productive of the best results in bringing these people under control would be by the distribution of garden seeds among them. At present they are under little or no control; but, with the exception of those tribes known as the "head-hunters," they lead peaceable lives so long as they are unmolested.

BOTANICAL INVESTIGATIONS.

Throughout the trip an attempt was made to study the flora and to secure as many botanical specimens as possible. In this, however, I was handicapped, not only because of lack of press room, but also because of the nature of the trip, not having opportunity to thoroughly botanize in any locality owing to lack of time. Notwithstanding these handicaps, 242 species, from 3 to 5 specimens of each, and a few unnumbered specimens were secured. This, however, was only a small per cent of the number of species observed, the great variety of vegetation in the forests and on the mountains being almost bewildering. In collecting, preference was given to the more rare species and those of economic importance, especially the grasses. It will be some time before these specimens can be identified and a full report submitted on this subject.

Sand-binding plants.—Along the coast at several points, Aparri, San Fernando, and Iba, certain sand-binding plants were observed, which may prove of considerable economic value. At neither of the places mentioned were there any extensive sand dunes, but the sands that comprised the low ridges immediately above the high-tide marks were entirely prevented from drifting by these plants.

At Aparri a species of *convolvulus* was observed, covering large areas in conjunction with a small-flowered shrubby species of the *Leguminoseæ*; the former was creeping, much branched, and rooting at the nodes, with thick, shining leaves and purple flowers, the vines being 10 or 12 feet long. The specie of *Leguminoseæ* has creeping woody root stocks 10 to 15 feet long, which root at the nodes and at frequent intervals send up shrubby branches 1 to 1½ feet high, bearing numerous grayish leaves, numerous small pale-blue flowers and small pods. These two species were also noted at other places.

At San Fernando and Iba the well-known sand-binding grass *spinifex* was abundant, often extending its stout root stocks for 20 feet or more. Here also another species of *leguminoseæ* was observed, a creeping vine, 10 to 15 feet long, much branched and rooting at the nodes, producing large glossy leaves, a few large purplish flowers and large pods.

These four species should prove to be of much economic value in those localities in the Tropics where large areas of drifting sands exist.

Exhibit Q.

REPORT OF THE BOTANIST ON THE ROYAL BOTANIC GARDENS OF CEYLON AND THE BOTANICAL GARDEN AT SINGAPORE.

THE ROYAL BOTANIC GARDENS OF CEYLON.

Sir: The Royal Botanic Gardens of Ceylon are at Peradeniya, 4½ miles from Kandy and 70 miles from Colombo. They consist of about 150 acres of undulating land, situated on a horseshoe-shaped promontory, surrounded on three sides by the Wahaweli River. These gardens are the center for botanical work in the island, and there are branch gardens at Hakgala, at an altitude of 5,600 feet; near Nuwara-Eliya, at Henaratgoda, 17 miles from Colombo, at sea level; at Badulla, on the east side of the mountains, and at Anuradhapura, in the northern part of Ceylon. These branch gardens are used very largely as experiment stations for testing the adaptability of various economic plants to the several sections of the island.

When the botanic gardens were originally established, and for many years thereafter, the chief object in view was the working up and cataloguing of the flora of Ceylon; but at present the economic feature very largely predominates in the work, especial attention being paid to the development of new and better varieties of the native fruits and in testing the adaptability of foreign plants to the climate of the island with a view to introducing the more valuable kinds into cultivation.

The systematic work of the flora of Ceylon is embodied in Trimen's very thorough manual of the Ceylon flora, which he began three years before his death and which was finished by J. D. Hooker.

In making the botanical collections, practically the same methods were employed as are used in the United States. Mr. Willis said that when anyone was sent out from the gardens to collect, he was instructed to secure specimens sufficient in quantity to make about twelve sets, one set of which was placed in the garden herbarium, and the others used for exchange purposes.

In the past various English officers stationed in the island have shown their interest in the science by collecting in different sections where they may have been stationed and sending their specimens to the gardens. A large part of the collecting for the garden is done by natives who have been trained for this purpose, but in many respects they are very unsatisfactory collectors. Mr. Willis stated that they would generally take the most accessible sections and collect the most common plants, paying very little attention to habitat, locality, method of growth, etc., so that it was generally necessary to have some European accompany an expedition in case one wished for accurate data.

The Ceylon herbarium is kept distinct from the general herbarium, the specimens being mounted and labeled similarly to those in the United States National Herbarium, only on thinner paper. Some of the specimens are glued on the sheets and some are strapped on with gummed strips, and on the larger plants both methods are used. The herbarium cases are very similar to those used in the United States Department of Agriculture, except that they are of hard wood with solid doors. Much trouble is experienced from the ravages of insects and evidently no amount of poisoning will keep them from destroying the herbarium specimens. Constant vigilance is necessary to protect the specimens, and the whole collection has to be thoroughly looked over every two months and fumigated when necessary. At Peradeniya no trouble is experienced from dampness.

The general collections at Peradeniya are kept separate from the Ceylon plants, and it is the policy of the director to exchange specimens only for other tropical material, no attempt being made to build up a large general herbarium, which would mean a great increase in expense in protecting against the ravages of insects.

The system of recording the plants in the garden is very complete. Each section of the garden is divided into squares, by lines running north and south and east and west, about 10 yards apart. Each individual species or group of species has a serial number, which is given the plant when it is placed in the garden. On the larger plants the number is stamped on zinc and nailed to the tree trunk; on the smaller ones it is attached by wire. The manner in which the record is kept is as follows: The plant number is placed at the head of the record sheet, followed by the scientific name of the plant and the authority who named it; then about half a page is left blank for synonyms; on the lower half of the page is kept the record of the plant itself, a reference to the particular square in which it is growing, the date of planting, its source, and all facts that are observed regarding it during the time that it is in the garden. If the plant dies or is cut down the record remains under its serial number. These record sheets are arranged according to number and, in a smaller card catalogue, the scientific names of all the plants in the garden are arranged alphabetically with reference to the serial numbers on the record sheets.

One of the present objects of the gardens is to introduce various species of economic value into cultivation among the natives. It has been found exceedingly difficult to persuade the natives to try anything new, and absolutely no good is derived from publishing and distributing circulars among them. They do not take enough interest to even send to the gardens for the seeds or cuttings. If the seeds are distributed to the natives very probably they will be thrown away and no attempt made to cultivate them, unless a threat is made to punish them in case they fail to report the results. More success, however, is being obtained by working through the school children in establishing school gardens and giving the children the seeds to care for, and in this way various plants of economic value are being slowly introduced into cultivation.

According to Mr. Willis, the best place in the Tropics to do scientific work—that is, in the determination of specimens, etc.—is at the Calcutta Gardens, the second choice being at Buitenzorg, Java. At the latter place, however, one is handicapped by a very disagreeable climate and short working hours. He considered that it would be to our advantage to work through the Calcutta, Buitenzorg, Singapore, and Melbourne gardens, and offered all facilities at Peradeniya in case it was deemed advisable to send any one there for any length of time. He also offered to exchange living plants, seeds, botanical specimens, and publications with the bureau of agriculture in Manila.

In discussing the question as to the location of a botanical garden, if one is to be established in the Philippines, he very strongly urged that, if possible, it should be located in the mountains, between one and two thousand feet above the sea, because under such conditions the temperature is much more suitable for work, especially if a herbarium is to be maintained, little trouble being experienced from moisture at such an elevation.

For detailed information concerning the gardens at Peradeniya, see the "Official Hand Guide," and also volume 1, part 1, of the "Annals of the Royal Botanic Gardens," June, 1901.

THE BOTANICALS GARDEN AT SINGAPORE.

The botanical gardens at Singapore were established in 1875 by Mr. Murton, who was the first director. At present the gardens are under the direction of Mr. H. N. Ridley, who has but one European assistant, the remainder of the garden force being comprised entirely of natives, who attend to the gardening, herbarium, library, and all clerical work, and who, according to Mr. Ridley, need constant surveillance, for otherwise they shirk their work. With this force the director is expected to work out all problems in agriculture pertaining to Singapore in horticulture, in economic botany, vegetable pathology, economic entomology, etc. The results of the investigations are recorded in two publications, a "Journal," consisting of technical matter, and a "Bulletin," in which are made known the results of the economic investigations regarding the agriculture of Singapore.

The herbarium consists of a full representation of the flora of Singapore and many plants from the Malay Peninsula and the neighboring islands. The plants are mounted on brown Manila paper, the sheets being somewhat larger than those of the standard herbarium size. All the plants are mounted by using glue, and where necessary, straps are added. Very heavy or bulky plants, like the palms, are mounted on cardboard by sewing the plant to the sheet. The plants are poisoned after mounting by painting them with a solution of corrosive sublimate and carbolic acid; but even when so poisoned great care must be taken in protecting the specimens against the ravages of insects, and it is necessary to thoroughly examine the herbarium every few months and destroy such insects as may be found in the cases. All the herbarium work, with the exception of determinations, is done by natives. Comparatively little trouble is experienced with moisture; but whenever a herbarium plant is found affected with mildew it is painted over with alcohol and allowed to dry, and then placed in the herbarium again.

At Singapore, as at Peradeniya, colored drawings of the native plants are being prepared, the work at Singapore being done by a Singalese man from Ceylon, a member of the same family which does all the drawing for the botanic gardens at Peradeniya. It is interesting to note that certain colors are useless in the Tropics, as the climate causes them to fade. In case it is found advisable to have any colored drawings prepared in the Philippines, it would probably be advisable to correspond with Mr. Willis, director of the gardens at Peradeniya, as to what colors should be used under tropical conditions.

The equipment for a botanical expedition under tropical conditions in most respects is very similar to that which one would use in the United States. The food supply is very important, but everything should be sacrificed to the botanical equipment. Presses similar to those used in the United States can be used in the Philippines, but leather straps will be found very unsatisfactory, as they are soon destroyed by the climate. In place of straps, ropes or thongs made from native creepers should be used. In cases of emergency very serviceable cases can be made readily of bamboo, bound together by thongs of rattan or some other native creeper. The presses used at Singapore are considerably larger in size than those generally used in the United States, but I could see no advantage to be obtained from this larger size, except in case they are used for some of the large plants, such as the palms.

I believe that ordinary felt driers can be used to advantage in the Philippines, although heavy bibulous Chinese paper is the only kind used at Singapore. In the dry season the plants can be thoroughly dried in the sun, but in the rainy season it often becomes necessary to resort to fires for drying purposes, the presses full of plants being arranged near the fire and a constant watch being kept that they do not ignite. A double canvas tent should be taken and plenty of rubber clothes for wrapping the presses in case of rain. A tin collecting case is practically useless under tropical conditions, except for collecting fungi and a few of the more fleshy plants. The most convenient collecting case is an ordinary portfolio, which is best if covered with tarred canvas, as the cover is more durable than anything else under tropical conditions. Coarse plants can often be brought to camp in good condition by simply gathering them and carrying them in an ordinary gunny sack. It is very probable that sacks made of gutta-percha would be of great value for the purpose of collecting and transporting specimens. Delicate plants like many of the orchids should at once be placed in packets before putting in press. Very fleshy flowers, like many of the araceae, should be immersed in alcohol or boiling water for some time before attempting to dry them.

In the field great care should be taken in taking data, especially in regard to the color of flowers and other characteristics which may be obliterated in drying. In general, however, the methods of taking notes are the same as those used by professional collectors in the United States.

When on botanical expeditions, Mr. Ridley aims to collect four specimens of each plant, one set being placed in the garden herbarium, and the others used for exchange purposes and general distribution. Under ordinary circumstances, however, I should deem it advisable to make more than four sets. At the Peradeniya gardens Mr. Willis aims to collect 12 specimens of each plant. In collecting in the Philippines for the numbered collection I should consider it advisable to collect at least ten specimens to represent each number.

In making extensive trips into the jungle it is necessary to employ an extensive force of natives to carry the equipment, food, etc. It is also necessary to have some one who is expert in climbing trees, in order to gather specimens of the jungle creepers and trees. In the highest trees specimens are frequently collected by locating the flowering branch with field glasses and then using a rifle to bring down the specimens required. A very important article of the equipment is a pruner, which can be attached to the end of a long pole and worked with a rope or lever arrangement.

Respectfully,

Elmer D. Merrill,
Botanist, Bureaus of Agriculture and Forestry.

To Prof. F. Lamson-Scribner,
Chief, Insular Bureau of Agriculture,
Manila, P. I.

Exhibit R.

NOTES ON AGRICULTURE IN CEYLON AND ON THE BOTANICAL GARDENS AT PERADENIYA.

By Thomas Hanley.

After reaching Colombo we paid a visit to the cinnamon gardens. The term gardens can scarcely be applied here, as the cinnamon is growing irregularly over the uncultivated ground. Each bush comprises a number of shoots from the old stem, which are cut back periodically for the bark, which forms the quill cinnamon of commerce. The roadsides about here are covered with a dense growth of sensitive plant, which we understand is a native of Central America and has become naturalized here in many places. The lantana shrub, that we so carefully cultivate for greenhouse and garden effects in the States, is also growing wild. This is one of the plants that spreads with such rapidity in tropical countries as to become a serious hindrance to cultivation.

On our return from the gardens we passed by the bungalows of the wealthy, where tropical vegetation could be seen at its best. There are here cocoanuts, arecas and caryota palms, the screw pines, hibiscus covered with scarlet blossoms, plumiera trees loaded with their sweet-scented, creamy-white flowers, jack fruits, mangosteens, and a great profusion of allamandas, covered with their large yellow flowers. The hedges were in many places composed of Aralia filicifolia, crotons, and acalyphas. The brilliant appearance of the foliage of the last two, together with the many showy colored flowers, gives a brightness of color to these gardens that is unknown in a temperate climate.

In traveling by the night train from Colombo to Kandy we made the acquaintance of an educated Singalese. Our conversation drifted to the agricultural resources of the island. Upon this subject he could give a great deal of information. He owned a plantation upon which he made cocoanut growing a specialty, and he seemed to be well posted upon other industrial lines. Upon being asked as to what are the principal agricultural resources of the island, he replied that cocoanut growing, the raising of rice and tea were the principal ones. "How long does it take before the cocoanut trees bear fruit?" "About eight years." "How far apart are the trees planted?" "Twenty-five to 30 feet." "Do you get a better return in this way than by planting closer together?" "Oh, yes; the ground gives a greater yield than by the old method of planting from 15 to 18 feet apart." "What kinds give the best returns?" "The selected fruits from the finest trees give plants that make the most profitable returns." "What do you call the finest trees, the dwarf varieties or the very tall ones?" "With many of our fruits we prefer dwarf trees, because they are not liable to be blown down by the storms and the fruit is easily gathered, being within reach." "In the case of the cocoanut, we would think that dwarf trees would be profitable because the nuts would have the full benefit of the sap, unlike the very tall ones, where part would be withdrawn to support the long, useless stem." To this suggestion he replied, "Our cocoanut trees have such a hold in the ground that the trees are not liable to be blown down by storms, and the fruit can easily be gathered by our native boys, who are accustomed to the work, and from experience we find that in every case on the tall trees there is a greater quantity of meat in the nuts, and the meat from larger sizes is much sought after by the purchasers." "How often do you gather the nuts and how are they dried?" "Once every two months we gather and desiccate them. They are dried in the sun, then sold and packed for shipment." "Is the cultivation of rice largely pursued?" "Yes; where the situation suits rice is a profitable crop." "In growing rice, do you transplant the young plants from a nursery bed or sow the seed broadcast on the cultivated ground?" "I have seen it transplanted, and as such it would yield good returns, but it entails much labor. The method we favor most, however, is to soak the seeds for three days, and when they are sprouted sow them broadcast on the moist ground. If sown in this manner they will take hold immediately and the birds will not interfere with them." "Is coffee much grown on the island?" "Not now; the blight destroyed our coffee plantations years ago." "You refer to the Arabian coffee; is not the Liberian coffee free from this disease?" "Not altogether; but that variety, although the yield is greater than the Arabian, is not as valuable or profitable, and very little of it is grown." "Do you cultivate any forage plants for food for domestic animals?" "No; there is such an abundance of green feed to supply the wants of stock that heretofore there has not been much need for the cultivation of forage plants, but at present something is being done in this direction by the botanical gardens.

Before going into the question of the tea industry our friend was obliged to leave us, but extended an invitation for us to call at his place of business, where he would be happy to give us information on the subject.

The view from the hotel at Kandy is very fine. In front is an artificial lake, from the opposite margin of which rise ranges of hills, softened in outline by the magnificent tropical vegetation. The cocoanut, the areca nut, the breadfruit tree, and the jackfruit, and several varieties of albizzia were in evidence everywhere in the town. The road leading to the gardens, about 4 miles distant from Kandy, brings to view many forms of tropical vegetation, such as mangoes, bananas, and several varieties of the palm family. A richness of color is given to the scene by the scarlet hibiscus, poinciana, and the masses of acalyphas, crotons, and variegated aralias.

The first view of the gardens after passing the entrance produces a feeling of wonder and delight in the visitor from a temperate climate. On either side of the straight narrow avenue is a bank of choice tropical plants; the wonderful Amherstia nobilis, fully in flower, strikes every beholder. Scarcely less striking is the brilliant flower Poinciana regia and the Brownia grandiceps. The aroma of the tropical jessamines and gardenias loads the air with fragrance. A variety of banana (Musa coccinia) was very striking. Hibiscus and rondelitias, russelias, ixoras, brunfelsia, strelitzia, all of which are so much prized in greenhouses, seem quite at home here.

The many marantas, dieffenbackias, helliconias, caladiums, and other ornamental foliage plants had a richness of coloring that we rarely see when grown under artificial conditions. The fine clusters of palms grouped in a circle opposite the entrance afford a good opportunity for study.

Perhaps no class of plants suffer so much at the hands of the botanist in the naming of them as palms, and, judging from the change of names in recent years, the matter does not seem to be yet settled.

A fine specimen of Attalea cohune, with its extraordinary long leaves, is interesting as being the plant which supplies us with street brooms in the United States. The oil palm of Africa (Elaais guineensis) attains here a wonderful height, and can scarcely be recognized by one who is only familiar with this class of plants in greenhouses. The thatch palms of the West Indies (Thrinax) are here represented by several fine species. The talipot palm of India (Corypha umbraculifera) here attains gigantic proportions. The spiny Oncosperma fasiculatus is interesting as being one of the native palms of Ceylon. Maxamiliana regia is remarkable for its size and large and curious flower. Chrysalidacarpas lutescens is our own familiar Areca lutescens, so well known as an ornamental plant in the United States, and grows here to a large size.

The Wallichia densiflora, a native of Malay and the Philippine Islands, forms a number of stems, covered with large caryota-like leaves. There is also here Verchaffelti splendens, a native of the Sechelle Islands. It is remarkable for its aërial roots, resembling somewhat that of the pandanus. There is also here a large specimen of the ivory nut of New Granada (Phytalephis macrocapa), the fruit of which gives us the vegetable ivory of commerce. Crytostachys renda, from the Malay Islands, is remarkable for its red-colored stem. Howea Fosteriana, familiar to us as Kentia Fosteriana of the greenhouse, grows here to a large size. Besides these there are many specimens of areca, Livistonia, hyophorba, licuala, and cocos. A palm from Madagascar, Dypsis madagascariensis, is remarkable for its great height and slender appearance. Passing along the avenue and leaving on the right a shady garden where are growing dwarf ferns, amaryleis and Eucharis amazonica in flower, we enter into the extensive arboretum. This part of the ground is beautifully situated and surrounded by hills. The rolling character of the land makes it an ideal situation for landscape effects. The greenhouse here was somewhat disappointing, but included a few varieties of orchids, among which we noted the Philianopsis schizerianium and Cattleya warzewitzia in flower. Several varieties of Anthurium were here, such as Anthurium schizerianium with its curious red flowers, and the varieties desmetianum, waroquiana, and regale, noted for their fine foliage.

The sides of the house were formed of laths, and the roof consisted merely of wire netting covered with fiber matting to give the necessary shade and break the fall of the rain. Close to the greenhouse is a wonderful specimen of Ficus elastica, with many of the roots partly exposed and curved, resembling somewhat the keels of boats. The trees and shrubs are dotted about the arboretum without any systematic order. The durian attains here the size of a forest tree. Parmentera cereifera, the candle tree of Panama, well deserves its name, from the resemblance of its fruit to candles. A fruit resembling large cannon balls could be seen on another tree. Hevea Braziliansis, the rubber tree of South America is here, and attains a large size. Agathis robusta, the Kauri pine of New Zealand, prized for its valuable timber, is represented by some fine specimens. The masses of resin found on the site of forests of these trees which grew ages ago give remunerative employment to some of the Maoris of New Zealand, who search for the resin under the surface of the ground.

The Queensland chestnut in flower shows its ornamental value in the Tropics. The Millingtonia hortensis, or the Indian cork tree, shows a bark somewhat similar to our corky oaks. The Placourtia inermis produces the lovi-lovi apples of the East. A fine tree of Toluifera perereirae from San Salvador gives us the valuable balsam of tolu. There are here several species of large-sized trees of terminalia of India. The variety Terminalia bellerica yields the myrobalins of commerce used for dyeing. We can see here the curious shaped fruit of the calabash tree, so much used for domestic purposes in the East. Ormosia dasycarpa of the West Indies produces very similar seeds to those which the Ceylon children sell to visitors for necklaces. A rose apple family (Engenia) is represented here by many varieties. Garcenia morello, with its small white flowers born about the woody shoots, yields the gamboge of commerce. Stifftia chrysantha is the tree daisy of the East. Some fine specimens of varieties of the albizzia, so largely used for shade in tropical countries, are here.

The araucarias from Queensland and the silky oaks from New South Wales, owing probably to the high and even temperature, grow here taller and more slender than in their native country. An avenue of Borassus flabelliformis palm, valued so highly for domestic purposes in India, seem too stiff to be used for that purpose. The royal palm of Cuba, Areodoxa regia, is also planted to form an avenue, and probably will surpass most varieties for this purpose. Cocoloba caracassiana is remarkable for the wonderful size of its foliage, and we think has some economic value which we now forget.

We saw many ornamental shrubs, notably the duranta of South Africa, Kopsia fruticosa, Memecylon umballatum, Hibiscus schizopetala, and Phyllanthus myrtifolius, the latter resembling somewhat our box shrubs. A couple of large clumps of bamboo, growing to an extraordinary height, gave us an idea of what may be expected in the Philippines. Besides the above, there are a great many other valuable and ornamental trees, most of which belong to the bean family. Before concluding this part of the subject, we must mention also the traveler's tree of Madagascar, about 30 feet in height, the foliage of which resembles our musas, but differs in the way the two rows of leaves are arranged on the opposite sides of the stem.

A small nursery, situated close to the arboretum, contains a number of economic plants, such as cacao, the Chinese ramie fiber plant, and Erythroxylon coco, the plant which yields the cocaine of commerce. On about a quarter of an acre of ground we found a number of mostly herbaceous plants to represent the natural orders, and close by is a small vegetable garden, where yams, beans, lettuce, and radishes are raised.

There is also situated in the grounds an artificial lake filled with water lilies, and a small, cemented water tank, where are growing, in pots plunged in the water, the nipa palm, the Rhapis flabelliformis, and various species of papyrus.

The screw pine family is represented in another part of the grounds by a number of fine varieties of pandanus, which, for lack of time, we had not an opportunity to properly study.

These gardens have been established for about a century. The work has been directed by men said to have a reputation in their calling. They had all the resources of tropical vegetation to enable them to establish and build up these gardens. In this they were much aided by the climate and beautiful situation, which was everything that could be desired.

Persons coming from a temperate climate and visiting these gardens for the first time will look upon the exhibits shown here with amazement. Nothing that they have seen in the finest hothouses can approach it in beauty, and no wonder they are impressed with the skill of the gardener that can so ably bring before us such a delightful and profitable exhibit. The almost unanimous opinion of visitors is that the gardens can not be surpassed.

Respectfully,

THOMAS HANLEY,
Plant Culturist.

EXHIBIT S.

REPORT OF INVESTIGATIONS IN THE ISLANDS OF CEBU AND NEGROS WITH THE VIEW TO THE SELECTION OF A SITE FOR A MODEL SUGAR ESTATE.

By OSWALD A. STEVEN.

MANILA, *March 21, 1902.*

SIR: Upon receipt of my commission as special agent of the Interior Department, dated February 10, 1902, and also your letter of instructions dated February 11, 1902, I proceeded, as per your instructions, to the islands of Cebu and Negros, for the purposes of examining lands on these two islands and to select a suitable site for a model sugar estate, experimental farm, and later, as per your telegram, to combine therewith an industrial school.

This report is based entirely upon my correct understanding of the kind of land, location, and surroundings most suitable for the establishment of the before-mentioned estate, farm, and school, and from all the places visited I have chosen only those so situated that they will meet all requirements.

A model sugar estate and experimental station combined should be situated upon land that stretches from the sea beach inland to and including the mountains. Such land should be so varied that there are many diversified soils, flat dry lands, low wet lands, heavy soils, light soils, rivers flowing through the place, some timber. The reason for owning the first ranges is to secure the different elevations necessary for experimental work. A reason also is that the varied natural productions of the Philippines require, to perfect them, different surroundings, elevations, and soils; for instance:

COCOS.

For the manufacture of copra, to attain perfection, requires the strong, briny air of the sea, and only grows to perfection near its shores. It is invariably attacked, when planted inland, by a large bug, which either kills it or stops production.

SUGAR.

The tendency of the sugar planter in the Philippines is to grow sugar only on the low level lands, where the soil is largely the same over the entire islands, namely, a black heavy soil or a brown loam. With an abundance of level land the planter has not been compelled to cultivate the higher mountain lands nor a different soil from that he is conversant with, but immediately following the natural increase in the cultivation of lands to sugar, from modern methods of agriculture and machinery, demonstrating the immense profits from the proper cultivation of sugar, these other soils and elevations will be brought under cultivation, and a cane seed especially adapted for such soil or elevation will have to be primarily grown by the experimental station and hence the actual necessity for varied soils and elevations.

COFFEE.

Can be grown on most of the islands of the group where there are timbered gulches or ravines, and up to an elevation of 2,000 feet. Coffee in these islands lately had a set back from a scale, the native grower just "dropped it," but the manager of a modern farm will be able to rid himself of the scale, but must have the right location to grow the coffee.

After an education in this commodity it is only a question of time when coffee can be a large export, for the soil, climate, and conditions are just suited to it. The most expensive part in the raising of coffee is the labor, and here in the Philippine Islands this item is reduced to a minimum.

The machinery required for the proper marketing of coffee is so simple and cheap that it figures very little in the expense, and even the poorer natives here could raise and market a choice coffee if shown how. The principal and most important part in the whole process is the grading or classing of the berry, but it is essential that high elevations be secured for best results.

RICE.

The low lying, wet, swampy lands, difficult of drainage, have, under proper cultivation, the essential qualities required for the perfect raising of rice.

TOBACCO AND ABACÁ.

I am not intimately acquainted with, but am told that the lighter sandy soils are the best lands for tobacco, but am assured that it is not the lack of soil in any neighborhood that stays the production, but lack of knowledge in the curing of tobacco which helps to keep down the price. Abacá flourishes to perfection only in the highest altitudes. I would note here that there are many small islands in the group where tobacco and abacá and coffee could be profitably raised, which are now absolutely nonproductive.

GABI.

Gabi, or the Hawaiian taro, is grown in the Philippines on dry land, pulled and eaten before it has attained half its growth. Low, swampy land, or land that is capable of irrigation, is what is needed to perfect the growth of this tuber. Here it is not considered of much value, but I would urge as an incentive to the furtherance of its production:

That when "Taroena," an invalid's or young child's food, was placed on the market in the United States of America it sold for 25 cents per package (I think half a pound). The quick demand for it, owing to its peculiar food values, sent the price up to 50 cents, and the supply can not equal the demand to-day. There is more nutriment and sustenance in one root of taro, properly grown and cooked, than in all the fish or meat foods a Filipino eats in two days. It is an industry that should be fostered, and I am pleased that the head of the commissary department at Iloilo, Major Stivers, is working hard in the provinces to get it properly planted and grown, for the purpose of supplying United States troops in lieu of other vegetables.

TRANSPORTATION.

Water.—Water carriage of the productions from the model estate, at the lowest possible figure, is an item which can only be obtained where the danger to vessels carrying freight is reduced to a minimum in the port or waters where they obtain such freight.

Land.—Good roads are of the first value and material for their construction on the estate should be in the vicinity. Hence, sand from a beach, bowlders from rivers, limestone and other road-making material from quarries at the back, in the hills, are important.

WATER CARRIAGE ON THE ESTATE

is of very great importance. By water carriage I mean that where there are rivers on the land I would tap them in the mountains, and in a wooden V flume transport my cane to the mills without the aid of animals or wheeled vehicles. Hence another reason for owning mountains back of the estate. Also the fact that rivers are quantities that are a necessity, from the fact that lands in some seasons may need irrigating, at others they serve for the purpose of drainage.

SAVING OF LABOR.

The natural advantages of the site should in every way tend toward the saving of labor, which means time and money.

MINERALS.

Especially coal, in the vicinity would materially assist in the accomplishment of the beneficial work for which such model was intended.

Adjoining and in the vicinity of a model sugar estate there should be enough farms now raising sugar whose cane could be ground at the model mill, the returns from which, being carried to the credit of the mill, would pay off the indebtedness of the mill and farm in five and a half years at present prices of sugar and under present conditions.

These mentioned requirements, together with the fact of suitable soil as to quality and depth, is what I am certain is necessary to the site upon which is built a model sugar mill and experimental station.

Such locations, each of about 700 hectares, with government land in the interior at the rear of such land, is at San Carlos, and for a second choice Bais.

At both of these places I made a proposition as follows: That the sugar planters, or residents of the pueblo, would purchase such specified vacant land in their vicinity, and deed it to the government; also give rights of way for railroads over their plantations, which part of said road running over their land they should maintain to the satisfaction of the manager of the model farm; also that such plantations should contract with the model mill for the grinding of all their cane for a term of ten years from date of erection of mill, at a percentage of proceeds in sugar not to exceed 50 per cent; also that they, the planters, would enter into an agreement to keep their lands grown to cane during the term of ten years, and that such planters would cut their cane and supply it to the cars on track, at the written request or demand of the manager of the mill; then, and in the case of legally agreeing to perform these items of agreement, I would advise the agricultural department of the Philippine Islands to cause to be cultivated such lands deeded in all modern methods, and to erect such modern buildings, machinery, etc., for the extraction of sugar, and to enter into all agreements as a party thereto. Such mills to be not less than a 50-ton mill per day, with all the very latest appliances; also that the department should and would introduce and propagate new seed cane, beneficial to the lands of the islands, and sell the same after production, and would in every way advance and benefit by progressive methods the sugar and other industries; and that such land, if at any time the department decided to sell the same, should be first offered to previous owners of the land, at a price equal to the highest price offered, before being sold to other parties.

As an assistance from a financial standpoint, in the matter of comparison between production now and what will be raised, I offer the following, which is correct, and based upon present prices, both here and in the United States:

Present.

1,000 hectares of land.
75 piculs sugar to 1 hectare.

75,000 piculs, at 4½ pesos per picul.
4½

337,500 pesos. Deduct transportation to Iloilo, at 25 cents per picul:
18,750 pesos.

Leaving 318,750 pesos, gross.

Future.

2,500 acres.
40 tons of sugar cane per acre.

8)100,000 tons of cane, 8 of which to 1 of sugar:

12,500 tons of sugar, at $65 gold, San Francisco.
65

$812,500
43,750, from which deduct transportation to San Francisco at $3.50 per ton:

$768,750, multiplied by 2, equals 1,537,500 pesos, gross.

If I were looking for a site for the establishment of a mill for commercial purposes alone, there are other places, namely, Isabela and Carbancalan, with their surrounding country, that are far better adapted for earning money alone, and which would be the finest investments in the sugar world; but I hold to the fact that you are wanting the lands suitable for diversified industries, with all possible natural advantages, and which will yet be revenue producers. The soils of the last-mentioned places are rich, level, and well watered, and there is government land in the vicinity, but they are not the most desirable, owing to their inability to comply with all the conditions mentioned before.

A synopsis of my trip is as follows: Left Manila in government steamer to Balamban, Cebu; worked the country in the locality; soil good and varied, but poor harbors and transportation facilities bad. Crossed from there to Negros, and landed a little north of Calantravas; thence to Escalante. No good location until within 3 miles of the river Dinau, where there is a large tract of rich black land, formerly occupied by ladrones who were burned out some little time ago, and the land never again occupied. It stretches from the sea to the mountains, but a right of way is necessary to the river. There is lack of water on the land, although I think it could easily be brought there. The harbor at Escalante in the river is fine, carrying on the bar at low water 12 feet. The railroad boom seems to have died down, and options on land toward Barcolod can be had for the asking.

Journeying south to Potosi, I found on the beach deposits of emery; the formations of the bluffs on the coast line principally of limestone. The river at Potosi should be explored, now that Maceo is in, for oil is reported both there and in the Dinau. In going farther south nothing of importance appealed to me until I came to San Carlos, where the condition of the country spoke for itself. Emphasizing here what I have said before, San Carlos is the acme of perfection for a model sugar estate. From San Carlos went to Mermosilla; and from here down to Bais the mountains incline to the sea, leaving few stretches of level land except in two or three places, but the landings were poor; no protection from sea or wind. Arriving at Bais was disappointed at the north harbor, but the south harbor and entrance can be manipulated very cheaply. It is landlocked, though there are many channels, but it is good and safe. Here, as I stated before, was my second choice for a site for a farm. Went to Dumaguete, but stayed only a short while, for the harbor is open, and in slight storms vessels would have to slip and run to Bais for protection. Left here for Iloilo and thence to the Ilog River.

Here is a tract of country that will some day be one of the most productive areas of country in the Philippine group, but the planters are poor. Their crops are good, but they are in the hands of their agents, who hamper them, and the interest is as high as 25 per cent.

For future commercial purposes the government should condemn the land at the entrance of the river Ilog for harbor purposes. for the building of jetties at the entrance of the river will allow the channel to be kept clear on account of the force of the current from the river being concentrated and increased. The soil as one travels inland is fertile and rich, but the appearance of buildings, people, and things is as though they had lost all hope. There is in this valley alone 10,000 acres of land suitable for rice.

I went from here southwest through a fine stretch of country, wider or narrower, as the mountains verge to or recede from the sea, until I reached Isio. Here I was stopped by the constabulary from going farther south. I tried to hire men to go with me, for I had seen large pearl shells in that section, gold from Cartagena, coal from the back of Asia, and all my information as to lands was that they were from an agricultural point of view of the very richest; that the rivers were abundant, and here and there a good harbor; also that timber was plentiful for any kind of local purpose or industry. I tried to go in, and I wish for your authority to go in now, for the knowledge of locality and productions alone would be of immense value to you, even should I be unable to find a site of more importance than those already stated. Besides, the lands in this vicinity will be more or less government lands, and open for settlement. Not being allowed to go south, I went north to Himamaylan, where there is a small, safe, and pretty harbor for light-draft vessels, worth consideration as to condemning water frontages. For a small expenditure of money here in wharfs and along water frontage would bring in a revenue immediately. The soil is rich and only the level land is cultivated. Cane is reported to give 100 piculs of sugar to the hectare, but I doubt that this is generally true. From actual statistics gotten by me from plantation offices throughout the island, I find a fair average to be 75 piculs of sugar to the hectare. From this place I went to Talaban, Binalbagan, Guinigaran, Pontevebra, Candaguit, La Carlota, La Granja, Valladolid, Bago, and Bacolod, crossing over to Iloilo, and taking steamer to Manila, where I arrived on the 20th instant, having been away five weeks.

The coast line of the maps furnished me is not correct.

Should you decide favorably on either of the selections made, before allowing me to go into the southwest country, I would advise you sending myself or other person to the towns of Bais and San Carlos, hold a meeting of landowners in the neighborhood, get legally drawn up the best offer that they can make, and submit both for your choice of acceptance.

I have to thank the military and constabulary throughout the island of Negros for their courtesy, information, and assistance. I want to urge upon you a fact not appreciated by anyone in the Philippine Islands—that the labor used on plantations, taking into consideration the poor food, low wages, unsanitary conditions of living, and ancient methods of cultivation, is equal if not superior to the Japanese or Chinese employed as plantation labor in Hawaii; and I am prepared to prove this statement at any time, and don't bar anyone who thinks he can refute it.

Very respectfully,

OSWALD A. STEVEN.

Hon. DEAN C. WORCESTER,
Secretary of the Interior.

EXHIBIT T.

REPORT ON THE AGRICULTURAL CONDITIONS ALONG THE LINE OF THE MANILA AND DAGUPAN RAILROAD.

MANILA, P. I., *June 9, 1902.*

SIR: I have the honor to submit the following report on the character of the country and the present practice of agriculture along the line of the Manila and Dagupan Railroad, and at the towns of San Fernando, Angeles, Magalang, and the government experimental farm about 10 miles from Angeles and 2 miles from Magalang, and also at the towns of Tarlac, Dagupan, and Lingayen:

I was greatly surprised at the large fields, sometimes 500 acres or more in a single level stretch, and I am satisfied that American machinery can be successfully used, and that its introduction will be followed by a wonderful development of the country along this railroad. There are level stretches of land 40 miles on either side of the railroad reaching to the foothills of the mountains.

The plows used by the natives are too small to do good work. They cut a furrow about 4 inches wide and 3 inches deep. The result is that the furrow is merely turned upon its edge and the grass is left growing and takes the nourishment from the crops. As the plow is the only implement they have, it is used to cultivate the crops, and, as a result, the cane and corn are planted in rows about 18 inches or 2 feet apart, so as to keep the grass from growing, because, with these plows, only a narrow space can be worked, the method used being to throw a furrow to each side of the row.

A cultivator would be of great advantage in this case. With wider rows and better cultivation, longer and better cane and corn could be raised. The harrow used is made of bamboo and is too light to do good work, but an American harrow would be useless unless the ground were properly plowed first by an American plow.

The rice is first sown in a seed bed, and is then transplanted by hand, one stalk at a time. They say when the rice is sown broadcast poorer returns are made at harvest. The reason is the ground is only scratched, and if the seed were sown broadcast the grass would choke it out, and the natives, to avoid this, wait until it is about a foot high, then plow the ground and transplant it, and in this way it is not choked out by the grass. But on properly prepared land seed could be sown broadcast or, better, by drill, and would yield larger crops than are obtained by transplanting.

The native method of reaping the rice is to cut one stalk at a time. This is a very tedious process, and as rice is harvested after the rainy season, when the ground is dry and solid, there is no reason why a reaper could not be used.

The same may be said of all the crops grown here. Machinery could be used to advantage. The first thing to do is to get the land properly plowed and harrowed with American machinery, and then agriculture will be very easy, and the wonderful fertility of the soil will enable large crops to be grown.

When I say agricultural machinery can be used here, I make the statement after careful study of conditions and personal observations. While on this trip I went into the fields and examined the plows and the work. I also talked with intelligent Filipinos who own farms, and they all say that they know that almost all of the lighter class of machinery that can be used in the States can be used here, and are pleased and much interested to learn of the introduction of these things.

For the first 10 miles out of Manila the soil is rather hard and poor, being a white-clay loam with clay in excess, and only rice fields are seen. Then for about 30 miles there are beautiful tracts of land and farms. The soil is a brown-clay loam, mixed with darker soil and organic matter. All through here we saw large rice fields, some tomatoes, sugar corn, maize, and cane fields. There are numerous rivers in this section.

In the vicinity of Angeles the land is sandy loam with moist, black sand, which is very fertile. This is an excellent cane country, and the rice fields are large and level as a floor. About 10 miles from here is the government experiment farm, just at the foothills of Mount Arayat, and here there is always a cool breeze and occasional showers, even in the dry season. The farm to-day is totally abandoned, and has grown up in grass and bushes; but these could easily be cleared by fire and a few men. As you enter the place, you come to a sandy loam knoll that is a perfect building spot, and it commands a view of the entire farm and is high and dry in the rainy season.

As far as I could judge, about 300 acres had been used for rice, this part being low and level, the rest of the farm being used for sugar and other purposes. The sugar land is apparently good. It is level, fertile, and seemingly full of organic matter. Bushes are growing now, but could be easily cleared. I judge that this field contains about 500 acres. In fact, the farm is suitable for any crop. Grass can be grown, and the right-hand side is a beautiful slope that could be used for a botanical garden, and through this runs a fine mountain stream of cool clear water. The bed of this is limestone. There are two mountain streams on the farm that could be used for irrigation in the dry season. I think this could be made a beautiful and productive station at a very moderate cost. In fact, the men used in the ordinary farming operations could easily clear the farm.

The country is about the same for 20 miles farther on toward Dagupan, and is very fertile. At Tarlac we visited a Spaniard who has a fine farm of about 300 acres. He raises rice and cane and also has some fine fruits of rare kinds, native to these islands. He has a cane mill and sugar factory.

In the locality of Bayambang, and for a distance extending nearly to Dagupan, while the soil is fertile, it is very low and damp, and rice is almost the only thing raised. The climate here is unhealthy. As the fields are wet, I am afraid American machinery will not be successful in this section, as at San Fernando, Angeles, Tarlac, and Magalang. At Dagupan the soil is very rich, and there are many gardens. Also rice and cane are raised, and cocoanuts are numerous and large. Dagupan is a business town, but it is very low, and we learned that the place is covered with water during the rainy season.

I am very much encouraged by my trip, and believe that American machinery can be used here to great advantage in every section as it is in America, and think this is the finest agricultural country in the world, if the conditions incident to a wet and dry season can be successfully met.

Respectfully,

James H. Shipley,
Farm Machine Expert.

Prof. F. Lamson-Scribner,
Chief, Insular Bureau of Agriculture, Manila, P. I.

Exhibit U.

REPORT ON THE AGRICULTURAL CONDITIONS AND POSSIBILITIES AT BAGUIO, BENGUET.

Baguio, Benguet, *July 9, 1902.*

Dear Sir: I have the honor to present herewith a report on Baguio from an agricultural point of view. In doing so I must apologize for its deficiencies, because writing is not in my line, and it would be a much greater pleasure to me to carry out practically the suggestions contained herein than to describe how the work ought to be carried out.

Respectfully,

Thomas Hanley,
Expert in Plant Culture and Plant Breeding.

Prof. F. Lamson-Scribner,
Chief, Insular Bureau of Agriculture, Manila, P. I.

Looking at Baguio, or rather that part of it which can be seen from the balcony of the sanitarium, one sees in front an irregular valley of about 15 acres. A small creek, issuing from a spring close by crosses it, forming in the center a sort of lagoon, where tufts of rushes and grasses are growing. From this flat the ground rises all around, in some places with a gentle slope, in other parts somewhat abruptly. At a few points the rising ground forms knolls; at other spots it runs into ridges. None of these rises are steep enough to make it uncomfortable in walking to the summit. A line passing along the tops of these knolls and ridges would extend, perhaps, over 2 miles. On the hillside upon which the hospital stands there is a grove of pines, and these trees are also dotted around some of the other elevations. Three or four native habitations are situated on the slopes, where camote and taro plants are growing, and attached to one of them there is a small coffee plantation. Beyond this line of hills there is an irregular chain of much higher hills, the sides of some of them being covered with pine, and, like the former, carpeted for the most part with a luxuriant growth of green grass. Those directly fronting the sanitarium are bare of trees and rocky. A few of these hills form knolls; some are ridges. A circular line drawn round the second line of hilltops would cover about 5 miles. Between these hills are gorges and gullies, where frequently small rivulets pass along, which are in numerous places overhung with splendid specimens of tree ferns that grow in the shade of the pines above them.

One point about the scenery is very remarkable, in the fact that it presents altogether a different appearance when viewed from different points, so that what is here written can not convey a proper idea of the landscape. This change of view is brought about by the great diversity of the parts that form the scenery. The slopes and ridges, the dells and gullies, follow no uniform line of conformity, and of course on this account present different views when seen at different points. The vegetation also helps to bring about what is here referred to. The hillside, presenting a bare appearance on one side, is covered with pines on the other; the gorge, presenting steep, grassy banks, with here and there a pine tree growing out of its sides at one winding, is a mass of tree ferns in another part.

Beyond this second range of hills on several sides can be seen a long line of mountains in the distance covered with pines, and the intervening country in many places comprises steep hills and ridges, which rise up in places almost perpendicularly from the deep valleys which they inclose. The scenery thus formed for many miles around vies even with that about the sanitarium in point of beauty.

The samples of landscape here seen are evidently the outcome of volcanic agencies; but the same Architect, if I might so express it, conceived the idea, and the lines of beauty carried out are based on the same principle. The scenery thus formed does not show any rugged grandeur, nor is it awe inspiring. Its characteristic feature, I would say, is a pleasing softness of outline brought about largely by the vegetation that clothes its surface; and this, with its diversity of views, its cool breezes, laden with the odor of the "murmuring pines," its springs and streams, probably accounts for the soothing beneficial effect it has upon the beholder. There could be no more suitable place for a sanitarium, and its selection for the purpose is manifestly a wise one.

The soil on the slopes and hills is composed of a red volcanic clay loam of great depth. The paths could be traced by the reddish color of the exposed soil; and as it rests upon no solid foundation, washouts are frequent. The patches of red one can see in many places around are caused by the water washing away the green vegetable coverings. At this season there is nothing binding about this earth. One can take a piece in the hand after a rain and with a gentle pressure it crumbles.

One characteristic of clay is that it is retentive of moisture; but here I found that after a heavy rain the water which lay a depth of several inches on a clay bank, where there was no surface escape, in one night drained away. Another point I have been told is that burned bricks can not be made out of it, showing that the combination of ingredients which makes farming so difficult in clay soil is not present to any extent here. The lowlands have a surface of black soil, in some places deep, and containing a great deal of vegetable matter in a partial state of decay, which, if cultivated, I feel assured would produce a splendid return.

The most surprising thing I noticed about here, and which I shall refer to in detail later on, is the range of vegetation that can be grown successfully, tropical plants growing alongside those of a temperate zone. In this respect it differs from any place I have ever seen, and shows clearly that the climate is such as to enable a great variety of vegetation to be grown.

The advantages to be derived from establishing a great national garden here would be many. I shall state some of them:

1. The climate is such as to enable one to grow a great variety of plants, tropical, subtropical, and those from the temperate zone.
2. Natural advantages in the way of landscape.
3. The salubrity of the climate.
4. Its future.

What is here stated expresses such a great deal that, at the risk of being thought too explanative, I will enter into detail on the subject.

For proof of the wide range of plants that can be grown, one can see ample evidence in the beautiful garden around the residence of Governor Pack, situated on a hillside close to the sanitarium. The governor is a firm believer in the agriculural resources of the province, and has demonstrated here the capabilities of the soil and climate. He is untiring in his efforts to benefit the natives, and is now about to open an industrial school where a practical knowledge of growing crops will be taught to the Igorrotes.

Nearly all tropical plants prized as being ornamental or valuable for their economic products, I feel confident would succeed here. I have evidence in this garden that those of the former class that are prized for their ornamental foliage, such as dracaenas and caladiums, would attain a richness of coloring here that is not as well developed elsewhere. The rich vegetation of the Tropics is the crowning feature of all gardens, and here we could introduce all that is choice and valuable.

Under the heading of subtropical plants would come the vegetation of a large part of Australia, such as the valuable eucalyptus, the acacias, the araucarias, and a host of others. New Zealand would furnish the valuable kauri-pine, the ornamental pittosporums, etc. Africa would give us the beautiful silver tree of Table Mountains, the Mount Atlas cedar, the Cape chestnut, and other valuable things. This is the ideal place for the cedar of Lebanon and cedrus deodra, as well as the choice azaleas and rhododendrons of the mountains of India.

It is scarcely necessary for me to enumerate the many trees of Europe and America that could be grown here. Nearly all the pines would probably succeed, and I have a hope that deciduous trees, such as oak, plane, and sycamore, etc., would be successful. No doubt exists in my mind but the giant of the West, the redwood of California, and the cryptomarias of Japan would be at home in Benguet, where their foliage would be bathed for the greater part of the year by the showers that they love so well.

The interesting and valuable flora of the archipelago ought to be a special feature of this botanical garden, and with the classes of plants enumerated above would, if the place were laid out and looked after properly, make this the leading botanical garden of the world. (I have seen the best and worked in several of the leading ones, and the above statement is based upon my experience.)

Coming now to the advantage the place has in the way of natural scenery, I can pronounce it, without any hesitation, to be the ideal place for a garden. The diversity of its surface, forming knolls, slopes, steep ridges, and deep valleys; the fern gullies, already formed and partly planted, and the groves of pine, all combined, are now charming, but by art it could be transformed into a scene that would captivate every beholder.

In dealing with the salubrity of the climate, I think that it must be admitted that without health no great work can be accomplished, and there is said to be no question but it is a wonderful health restorer. It is a pleasure to work outdoors, and the want of energy, prickly heat, etc., which so many people suffer from in the lowlands, is said to disappear in a short time after entering the region of the pines.

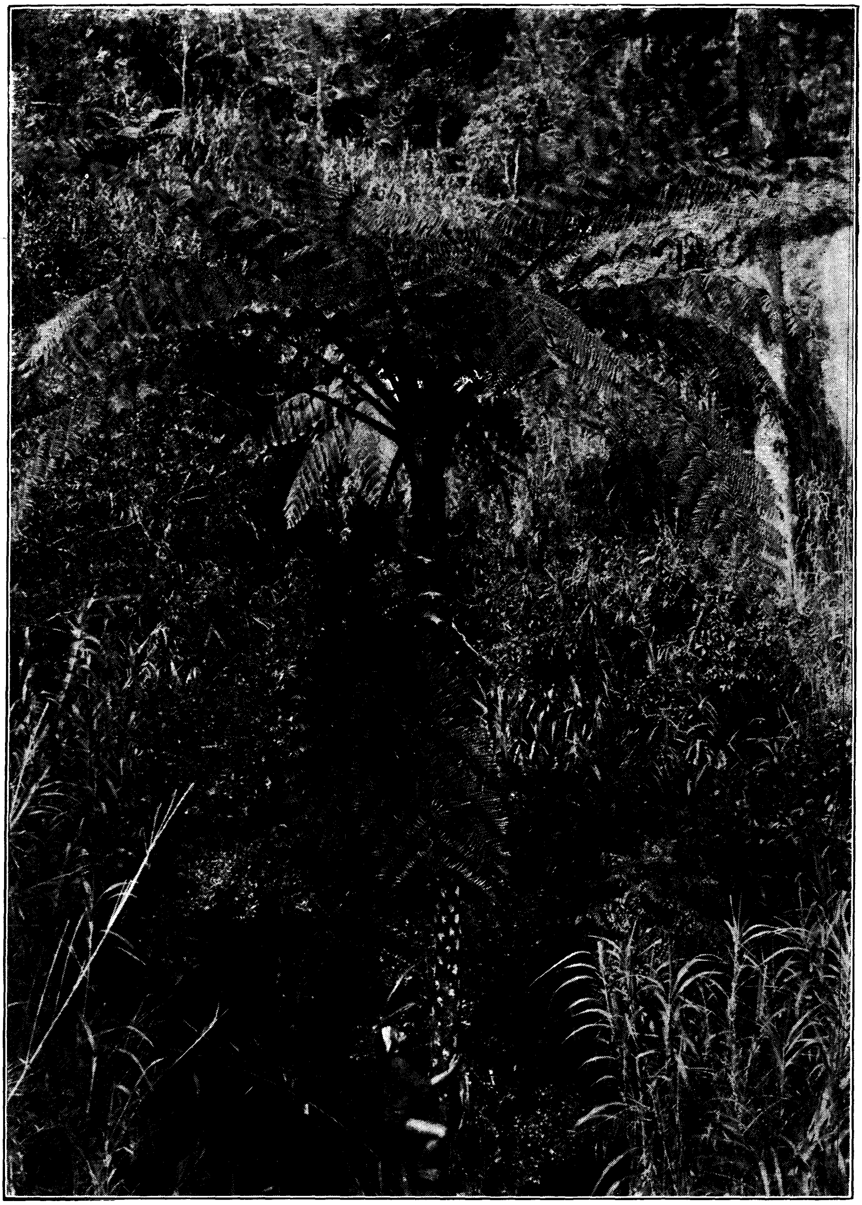
It would scarcely, however, be justifiable to establish a national garden far away from a center of population unless the future of the place would warrant such a course. The probability of a city springing up here, however, is very great. Already a scheme is under consideration by the civil government for having the business of the archipelago transacted here during a portion of the year. Sites are already provisionally marked out for several bureaus, including the weather bureau. The governor's residence will be on a beautiful hill commanding a view of the surrounding country, and no less beautiful is the hill selected for the agricultural bureau by Governor Pack, who is an indefatigable worker for the interests of Baguio.

Another point in favor of the place is that a good class of labor can be obtained. The Igorrotes seem to be in many respects dissimilar to other tribes. They are good workers, far better than the negro of the South, their honesty is proverbial, and their imitative faculty is largely developed. No doubt when properly trained they will become expert workmen, and the place can be developed at comparatively small expense. For the lighter work under the governor's industrial-school scheme there will be a couple of hundred young people available during a portion of the day under capable teachers.

For fear of being thought too enthusiastic about the place for a suitable site for agricultural work, and in order to be as just as possible in my views regarding Baguio, I will now enter into those points that would seem to be serious objections against its selection as a national garden for the islands. There is first the inaccessibility of the place, and the great effort to be undergone by those coming here, especially invalids. To lovers of mountain climbing and natural scenery this, of course, adds to the pleasure of a visit, but for ordinary people there is no doubt but that it is at present an arduous undertaking. A road, I believe, is now being constructed to

IN THE PINES, BENGUET.

TROPICAL VEGETATION, BENGUET.



IGORROTE CLIMBING A TREE FERN, BENGUET.

FOUR-YEAR-OLD COFFEE BUSH, BENGUET.

Dagupan, and when this is completed it will do away with this laborious travel that has to be now undergone over the mountain trail; and I anticipate a great rush of people here when this work is pushed through.

What seems another serious objection to the making here of an experimental farm by the agricultural bureau would be that in a great measure the work conducted would be only of value to the surrounding country that has a similarity of soil and atmospheric conditions.

Exhibit V.

PRELIMINARY REPORT ON THE WORK OF THE BUREAU OF AGRICULTURE, IN COOPERATION WITH THE MILITARY DEPARTMENT, IN BATANGAS PROVINCE.

Batangas, *August 31, 1902.*

Sir: The day following your departure (August 17), I began examining the different soils of this locality with a view to selecting a site for the experiment station, and I was fortunate enough to find a place which, to my mind, will answer the purpose very well.

The point I had in view in my search was to find a place suitable for alfalfa, a soil not too stiff, high and dry, with a gravelly subsoil and a water level sufficiently low to insure the development of a strong, healthy root system.

The place selected possesses all of these requisites. It is on the bank of the Calumpany River, near Batangas, and, as the land stands 25 feet above the river, there will be no lack of drainage. Furthermore, I made an examination of the perpendicular cut in the bank of the river and find that the first 4 feet of the soil are a rich loam, beneath which is a stratum of gravel extending to the water level. I was very much pleased also to see a large amount of well-rotted manure near by, and, as alfalfa requires a rich soil, I had a quantity of it spread on part of the land before plowing.

We began clearing the land and breaking some few days ago, but the weather was so bad that we have not made much headway as yet. It is certainly exasperating to plow a half a day and then cease operations for one or two days until the rain has ceased and the land is dry enough. Besides, the plows did not scour well the first day, and, in addition to this, the mules not having been trained to follow a furrow, they followed their own sweet wills and, in consequence, good work was impossible. Another thing which contributed to make the first day or two a source of worry to me was the fact that the men who presented themselves to plow knew absolutely nothing about plowing. They wanted to get away from the corral and were looking for a snap and, as such men are not desired anywhere, the corral boss was more than glad to get rid of them, and he went so far as to tell me so a few days ago, when he became very confidential after I told him that I wanted absolutely nothing but men who were raised on a farm and not in saloons. These fellows knew nothing about regulating a plow; they did not know what backbands and the notches in a clevis were for, and consequently, when the plow entered the ground until the beam was on the ground and the mules could not pull, they were absolutely helpless. Finally two men came out who knew something about plowing, and we are getting along very nicely now. I shall retain these fellows, and told the corral boss to strike off the rest and get me four good negroes, and to-morrow I shall have a set of six men with whom I can do something.

Now that the plows scour, the mules follow the furrow, and as the men who are doing the work understand their business, we are doing decent work. In fact, I am really homesick watching the furrows. There is not a stone in the land, and the plows do splendid work, as might be expected. It is a revelation to the natives to see the soil rolled in billows instead of only scratched. The presidente came this afternoon, and he was so enthusiastic that he asked me if I had any objection to his trying carabaos on one of the small plows to-morrow, and upon my telling him that I should be glad to see the experiment myself, he replied that he would send carabaos and a Filipino, and if the trial was a success he would order two plows, and that he knew of a number of others who would do the same. He requested me to write to you and find out if you would order the implements, through the bureau, for him if he gave you the money.

I made inquiries in regard to the chief agricultural products and find that at present the only articles exported from Batangas in any quantities are sugar and oranges; but the people have absolutely no conception of horticulture, and although hundreds of tons of oranges are exported, the industry could be greatly extended and the profits increased if the natives could be educated to the point of pruning their trees and otherwise taking care of their orchards. Improved varieties from Japan would also contribute much to the welfare of the people.

Sugar is still manufactured, but not anything like formerly. This decline is due partly to the ravages of war, and also to the low prices that have prevailed for the last few years. These prices have come to stay. Never in the future will rough sugar be worth what it has been in the past. I do not wish to say that cane growing is no longer profitable. I maintain, however, that the methods of culture and extraction in these islands are out of date—as much so as men-of-war built fifty years ago.

The meat-packing business is a paying one, and why? Because everything is utilized and there is no waste; bones, blood, hair, horns, and everything are saved as by-products. The sugar planters of the Hawaiian Islands and of Louisiana make money also, but they do not make it by throwing away 50 per cent of their sugar in the bagasse, 25 per cent of the remainder in the molasses, and turn out an article unfit for commerce. I visited one of the sugar mills in this province, and as a financial proposition I would not undertake to operate it at my expense if it were given to me.

In conclusion, I wish to say that I am told by reliable persons that cotton is grown in Taal and other towns, not on a commercial scale, but for local use only. The lint is separated from the seed by means of sharp spikes driven into two wood rollers. I also ascertained that the value of an acre of rice as presently cultivated is in normal times $12. In view of these facts, and considering the poverty of the people, I am led to believe that cotton might be used as a stepping-stone to better things.

At home (in Louisiana) when a young man gets married and starts life with a wife, a pair of ponies, and a pony plow, there is but one crop he can raise, and that is cotton. He plants it for three or four years and then buys a pair of mules, a wagon, and a cultivator, and then goes into the cane or rice business.

The reason for this is simple. Cane requires a deep breaking up of the land; cotton, on the contrary, does well on fairly compact soil, for if the soil is too loose the plant dies before the taproot can take hold of firm soil. It costs about $16 to seed an acre of cane; cotton, $2. In harvesting an acre of cane, 25 or 30 tons are to be hauled; cotton, three-fourths of a ton. To seed a 10-acre farm to cane in Louisiana and buy one pair of mules, one wagon, plow, harrow, and hoe, it costs $580. In short, it requires capital to produce cane profitably, whereas all that is necessary to raise cotton is a pair of ponies, a $3 plow, a light harrow, a hoe, and a carabao cart.

It is my opinion that these people will have to begin at the bottom; to grow a crop adapted to their present means. I was very much interested in what was said at the meeting in Lipa. Many things were discussed, and among them mules, etc., but the one question which was not discussed, and the one which will have to be solved before every other, is the question of where the money is to come from with which to buy mules, brood mares, and jacks. I am inclined to believe that before the Filipino will be in a position to pay for a $500 mule he will have to take a course in the cotton school or laboratory, or divert his attention to the cultivation of some other cheap-money crop suitable to his native ponies and carabao.

I admit that there are individuals in every town who have money, and it is in them that our greatest hopes lie for the immediate present; but the fact remains that the mass of the people, those who stand in need of guidance more than any one class, need a cheap money crop, and I hope we may find one, either of native growth or otherwise.

Very respectfully, W. J. BOUDREAU.

Prof. F. LAMSON-SCRIBNER,
Chief Insular Bureau of Agriculture, Manila, P. I.

EXHIBIT W.

REPORT ON THE ABACÁ OR MANILA HEMP SOILS OF THE PHILIPPINES.

By CLARENCE W. DORSEY, Soil Physicist.

MANILA, P. I., *September 10, 1902.*

INTRODUCTION.

At the present time abacá or manila hemp[a] ranks foremost among the exports of the Philippine Archipelago. While the excellent qualities of the fiber obtained from the abacá plant (a species of the banana family known as *Musa textilis*) have undoubtedly been known to the natives for hundreds of years, it is only during the last fifty or sixty years that considerable quantities of this material have been exported.

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[a] In this report the term abacá, used almost exclusively in the archipelago to designate the plant known to botanists as *Musa textilis*, will be substituted instead of the terms hemp, manila hemp, or manila.

It is stated that in the year 1850 7,309,296 kilos of abacá were exported. Twenty-five years later the shipment had increased to 32,414,215 kilos, while for the fiscal year 1901 111,216,563 kilos[a] were exported, which brought $14,453,110, so that some idea can be gained of the wealth this industry brings to the archipelago. Abacà fiber is used principally for making ropes and heavy cables and for binder twine, although large quantities of the finer qualities are consumed by the natives for weaving into various kinds of cloth.

The area of the archipelago where the successful cultivation of abacá is carried on, roughly speaking, lies between the parallels 6 and 14 north latitude and the meridians 121 and 126 east of Greenwich. In southern Luzon the principal abacá-producing provinces are Ambos Camarines, Albay, including the island of Catanduanes and Sorsogon. The islands Mindoro, Marinduque, Masbate, Samar, Biliran, Leyte, Cebu, Panay, Negros, Bohol, and Mindanao produce greater or less quantities of abacá fibers. In addition, the plant is grown on a large number of smaller islands which lie near some of those just mentioned. In many of the islands mentioned only small quantities of abacá are gathered, and frequently the little gathered is of inferior quality.

For the successful cultivation of abacá certain favorable soil conditions are essential, as well as suitable climatic conditions. The soil must be of lasting fertility and must be well drained, for abacá will not grow well on wet, poorly drained soils. The soils should be light and loamy, cool and moist. Gentle slopes, with what are known as "cool" lands, are to be preferred to swampy, low-lying lands, often locally known as "hot" lands. A moist climate is required, and it is often remarked in the abacá districts that the rainy season lasts the entire year, for the plant will not survive a period of six months of dry weather, and is seriously injured if more than six weeks elapse without some rainfall. A moist atmosphere with heavy showers at short intervals seems best adapted to the needs of the plant, with the present system of cultivation.

With the object of a preliminary study of the soils of some of the more important abacá regions, considerable time was spent by the writer in the provinces of Camarines Sur, Albay, and Sorsogon in southern Luzon, as well as the more important regions of central western Samar and northeastern Leyte.

So important is this fiber industry to the Philippines that every effort should be made to improve it by all possible means, whether it be improving the market conditions, spreading the industry and improved methods of cultivation, or improvement by selection of new and better varieties of plants. It should be the effort of everyone connected with the industry to add whatever he may to make it of still greater value to the archipelago.

CAMARINES SUR.

In the province of Camarines Sur there are several important abacá regions, the products of which are nearly all shipped from the capital, Nueva Caceres, situated near the center of the province on the Bicol River. The Mount Iriga district was the only one studied in any detail, but, as the exports of abacá amount to from 3,125,000 to 3,437,500 kilos per year, it can be seen that it is an important one. Other important districts are situated in the eastern part of the province in the vicinity of Lagonoy and in the western part of the province, especially in the country adjoining Pamplona. The Mount Iriga district is situated in the southeastern part of the province, and all of the abacá shipped from the villages of Iriga, Buhi, and Baao may be said to come from this district. Mount Iriga, around the lower slopes of which the abacá "lates" or farms are situated, is an old volcano forming a part of the chain of volcanoes which extends in a northeast and southwest direction. It lies about midway between the volcanoes Isarog and the Mayon or Albay volcano. Of less elevation than the other volcanoes, it rises above sea level approximately 1,220 meters. The form of the mountain is a symmetrical cone truncated at the top, with the slopes considerably gullied by stream erosion and washing. To the south and west are vast fertile plains formerly cultivated in rice; but at present, on account of the lack of suitable farm animals, these valleys are largely uncultivated.

It is on the north side of Mount Iriga that the cultivation of abacá is carried on so extensively, for on the south the slopes of the mountain possess strong, shallow soils that are unsuited to growing abacá. Apparently during the last eruptions of the volcano the winds blew from the south and all the finer ashes and detritus from the volcano were collected on the north side, and it is from the weathering of these fine ashes and dust that the soils are derived. In places on the north side of the mountain there are areas where the soils are shallow and consist largely of masses of large bowlders mixed with sharp, coarse sand; but over the greater part of the northern slopes the soils are deep and exceedingly fertile. They consist of soft, mellow loams, in places slightly sandy, to a depth of at least 3 feet, and in many places the soils exceed a depth of 3 feet. There is little change in character or texture between soil and subsoil, and the soils are always deep, 15 inches being about the average depth. These soils are rich in decayed organic matter, and even where abacá has been grown for forty years there is apparently no diminution of the original fertility. Protected from the washing of the heavy rains by the thick growth of abacá and by the always rotting mass of dead leaves and trunks of the plants from which the fiber has been extracted, these soils are kept in a state of almost virgin fertility, for all is returned to the soil on which it grew, except the extracted fiber.

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[a] Monthly Summary of Commerce of the Philippine Islands, June, 1901.

These soils possess excellent drainage, and the hardest rains readily percolate through them, on account of their loose, mellow nature. Their color varies from a purplish red, the color of the rocks and sands from which they are derived, to yellowish brown and jet black. On the lower slopes the purplish-red color predominates, while on the upper slopes the soils more commonly have a brownish or black color. These soils are thoroughly decomposed and contain no trace of the sharp volcanic dust and ashes from which they are undoubtedly derived. There are some slight variations where the rains have collected into streams and formed slight gullies down the mountain sides. Along such gullies there is found a greater abundance of coarse sand and frequently large masses of bowlders and stones brought down from the higher slopes.

Where there is an abundance of stones, or where the soils contain much coarse sand, such good results are not obtained as where the soils are deeper and consequently richer in plant food.

Abacá has been grown in this district for more than forty years, and the present prices have stimulated the development of the industry, and new lands higher on the mountain are being cleared preparatory to planting the crop.

The abacá produced in this district is shipped in large, loose bales on barrotos, the local name for the long, narrow boats used on the Bicol River. Two of these long barrotos are lashed together by means of bamboo poles and bejuco, and will carry a considerable load of loosely bound abacá to Nueva Caceres. Here it is assorted into the various grades by skilled workmen in one of the large warehouses and rebaled in bundles of 125 kilos each. From this city it is shipped by light-draft steamships to Manila, and from there to all points of the world.

ALBAY.

At present Albay is the greatest abacá-producing province in the archipelago. While the market price does not equal that of the product of Sorsogon or Leyte, still the prices at the present time are so much in advance of several years ago that the cultivation of abacá is practically the only industry in the province, and former crops and occupations are abandoned for the more profitable abacá. The province is fortunate in possessing two good ports, Legaspi and Tabaco, and from these large shipments are of almost daily occurrence. During the year 1900, according to the Monthly Summary of Commerce and Finance, the province of Albay shipped 30,382,812 kilos of abacá, more than one-fourth of the amount shipped from the entire archipelago. Large quantities of abacá are gathered in the region adjoining Tabaco, while the towns Polangui, Oás, Ligao, Guinobatan, and Camalig, in the central part of the province, all furnish considerable quantities for shipment. The very finest quality of abacá fiber is said to be grown in the rough and rather inaccessible southwestern part of the province. This is generally shipped from Donsol, in Sorsogon Province, although it occasionally finds its way to the Legaspi markets.

No mention of the soils of this province should be made without some reference to the majestic Mayon volcano, from whose ashes and dust nearly all of the soils of the province are derived. Situated near the seashore, it towers 2,415 meters above the surrounding country, and is a noted landmark in navigating the waters of this part of the archipelago. The cone is considered by many the most symmetrical of any volcano in the world. Numerous instances of damage wrought by its eruptions are recorded by Spanish and other observers, and even during the American occupation one slight eruption has taken place, although no serious damage was done.

Inasmuch as the soils of this province are derived from similar materials it is to be expected that they should all be quite similar. Moreover, the soils of this province are also somewhat similar to the soils of the Mount Iriga district, since all have been derived from volcanic rocks, ashes, and dust of similar composition. Volcanic soils are nearly always exceedingly fertile, and the soils of this province are no exception. Seldom are heavy clay soils found in the province, but all variations from light sandy loams to heavy sandy loams and silty loams can be found. Around the foot of the Mayon volcano abacá is cultivated extensively, especially on the northern slopes. The farms do not extend far up the mountain sides, although they reach greater elevations in the vicinity of Tabaco. Usually the lands around the base of the volcano are not as much sought after as the small hills and rolling lands farther west in the vicinity of Ligao, Guinobatan, and Camalig. Near the volcano the soils are black sandy loams, mixed fine black gravel, and a small proportion of silt and clay. Usually at a depth of 10 to 15 inches below the surface a layer of several inches of distinctive volcanic gravel and coarse sand is found, and under this heavier loams and fine sand occur.

In the soils here, as in all the soils of the province, the fine sand is sharp and feels like bits of broken glass mixed with the soil. These soils are fertile and support only a fair growth of abacá plants, but the quality is good. In some places around the foot of the volcano the streams are building up great sloping plains of black, loose, coarse sand, so open and porus that only coarse grass similar to the cogon (*Imperata arundinacea*), can find a footing. These sands would be fertile, considering the fact that they are so coarse and leachy, provided they did not shift and vary their position with each heavy rainfall.

In other places near the foot of the volcano, where larger streams occur, are great bowlder trains in places many hundreds of yards in width, and containing bowlders of dark volcanic rock weighing upwards of several tons. In one place a cocoanut grove was observed that was being slowly buried by the great mass of bowlders and stones being heaped upon it with each succeeding flood.

From Ligao toward Polangui there are large areas of rice land, but the latter town is in the center of a large hemp industry. The quality of fiber, however, does not compare favorably with that of the rest of the province, but corresponds more closely to that shipped from Daet, the capital of Camarines Norte.

Between Ligao and Guinobatan the hills and rolling lands are exclusively cultivated in abacá and many fine "lates" are seen. The soils in this section of the province are dark brown and yellowish brown loams that are composed of fine silt mixed with very fine sand and some sharp gravel and very coarse sand. These soils are rich and fertile, as the large fields of abacá testify. They are easily drained, and even the heaviest rains readily percolate through them. They have been cultivated in abacá for many years, and some of the best fiber of the province comes from this section.

On the hills west of the town of Guinobatan a fine quality of abacá is produced and, as noticed in so many other localities, the higher the location the better the quality of the hemp. On the top of one of these hills, perhaps 100 or 125 meters above the town of Guinobatan, a sample of soil was collected, which consisted of a rich, dark-brown loam to a depth of 10 inches, while the subsoil was composed of a dark-yellow loam with some sharp angular volcanic glass sand to a depth of 26 inches, and at this depth small sharp gravel was encountered. In a region of heavy showers at frequent intervals such a soil will maintain just the proper heat and moisture conditions, not only for abacá but for many other valuable crops as well. The underlying gravel beds will insure a perfect underground drainage, while the loamy nature of the surface soil will catch and retain the abundant rainfall. The rapid decomposition under tropical conditions of a moist and warm atmosphere of the small particles of sand and gravel constantly sets free an abundant supply of fresh plant food, so that the fertility of these soils is easily accounted for. In this section of the province many other crops were formerly cultivated, among which may be mentioned flax and wheat, potatoes, sweet potatoes, and corn; but the cultivation of practically all of these crops has been given up.

Between Guinobatan and Camalig a broad sloping plain of black shifting sand is encountered that has at present little or no agricultural value. The hills to the west of Camalig are used largely for abacá, but formerly some cotton and a fine variety of coffee are said to have been grown. The soils in the neighborhood of Camalig bear striking resemblance to the soils of the other districts mentioned in the province. On the sides and lower slopes of the hills are heavy brown loams, mixed with some sharp sand, while the subsoils are yellowish silty and sandy loams. On the crests of the hills and ridges sandy soils were noticed that frequently contain alternating layers of dark sand and fine gravel, interbedded with silt and fine sand. Much abacá of a good quality is grown about Camalig, and the region extends many miles to the west of the town. Good abacá properly cared for in this locality will average 2.7 meters in length. It is said that in the year 1892, from Camalig, 312,500 kilos of abacá were shipped each month during the height of the gathering season. Since that time no accurate statistics have been collected for this particular neighborhood.

SORSOGON.

This province contains many important districts exclusively cultivated in abacá, and the sale of this commodity constitutes its greatest source of wealth. In addition to the large areas under cultivation there are also large tracts which at present are rapidly growing up in dense jungle on account of the scarcity of labor to prepare the fiber for market. The harbor facilities of the province are not of the best, although there are several ports where steamships touch to receive cargoes of dried abacá.

The price realized for the abacá of this province, according to the market report of September 1, 1902, published in the Manila Daily Bulletin, is 27 pesos per picul, as against 26½ pesos for Leyte abacá and 24½ pesos for that of Albay. The largest shipments of abacá are made from Sorsogon, the capital of the province, near which the finest abacá of the entire province is produced.

The largest and finest "lates" or farms are situated near Irocin, in the southern part of the province quite near the active volcano Bulusan, but the abacá produced here is more fleshy and, while the plant makes a large growth, the quality does not compare with that produced in other districts near Sorsogon.

The finest quality of abacá is said to be grown near the barrio Pangpang or San Ramón, about 4 miles west of the city of Sorsogon. Abacá is grown on the foothills and lower slopes of what are known as the Castilian Mountains, evidently the dissected and eroded remains of a former volcanic group of mountains. The soils for the greater part consist of rich-looking sandy loams of dark-brown color, light and loose and always moist and cool, with the abundant rainfall and the protecting shade of many trees with wide-spreading branches. The protection of the ever-present mulch of decaying abacá stalks and leaves, as well as the leaves of the shade trees, also helps conserve the moisture in the soil, for in this locality the soils are shallow, seldom exceeding a depth of 2 feet. The subsoils are usually heavier in texture, although they nowhere in this vicinity can be called clay loams or clays, for a certain amount of coarse sand is always mixed with the soils as well as subsoils. The sands of the soils in this province have none of the sharp glass-like edges of the sand found in Albay Province, but they are rather more rounded and worn by atmospheric decay, as well as the wearing action of running water.

Great bowlders, often many feet in diameter, are found scattered about on the surface or deeply buried in the soil. These consist of dark-colored vesicular volcanic rocks, and it is from these rocks that the soil is being formed by the slow process of weathering and atmospheric decay. Cultivated to crops that would leave the surface bare the greater part of the year, these shallow soils would soon be washed to lower levels, leaving only bare rock in their place, but with the thick growth of abacá the soil is amply protected from the washing effects of heavy tropical rains. Fields of abacá were seen in this vicinity that are known to have been in cultivation for more than seventy years and, while the yield per hectare has undoubtedly greatly decreased, the quality of fiber has correspondingly increased, and this region produces white abacá of a fine quality.

From Sorsogon northward toward Bacón considerable abacá is grown, and of fine quality. Here the abacá is grown on a slight plateau, nowhere, perhaps, exceeding 100 feet in elevation. From Sorsogon the country slopes gradually northward, but near Bacón the change in elevation from the sea level to the upland is more abrupt. In this vicinity the soils approach in character those that have been described as occurring in the Mount Iriga district of Camarines Sur. The soils are rich, mellow loams of dark color, with subsoils consisting of loams of similar texture and composition, but of a decided yellowish color. In some places the soils become more sandy and grade into still more sandy subsoils. In places considerable numbers of bowlders are scattered about on the surface. Where the soils consist of the mellow loams large and well kept fields of abacá were noticed and, on account of the nearness to the cities Sorsogon and Bacón, little difficulty is experienced in getting sufficient labor to prepare the fiber for market. When so prepared, it is hauled in carabao carts or packed on the backs of carabaos to Sorsogon, where the work of re-sorting, grading, and baling is carried on.

Southeast of Sorsogon, just north of the mountains that form part of the series which surround Bulusan volcano, is a broken and eroded table-land, where many large and extensive abacá fields are seen. The quality of the fiber does not compare favorably with that of many other sections of the province, and many large fields can be seen that are uncultivated on account of the lack of suitable help. This broken and eroded plateau is more than 100 meters above sea level, and descends much more rapidly on the Pacific coast side. The soils of this plateau are uniform in character, and are heavier in texture than any observed elsewhere for the cultivation of abacá. In many places the soils were in poor condition; that is, they contained excessive amounts of acid and smelled badly, and showed plainly the ill effects of imperfect aeration and lack of proper cultivation. The soils of this section of the province consist of closely compacted heavy loams to a depth of 6 to 9 inches. The subsoils are heavy clay loams of a yellowish color. From the heavy character of both the soil and subsoil, good underdrainage could not be expected, and frequent stirring of the surface soil should be resorted to to prevent the top soil from becoming compacted and rendered impervious to water. With deep plowing and the application of green manures these soils could be made very productive, but in their present condition they are not well adapted to producing the best results with abacá. These soils have apparently been derived from volcanic rocks, presumably from former lava flows. The soils are many feet in depth, and only in places can the parent rock from which the soils are derived be detected. In many places in this region large bodies of land are frequently connected with each other by very narrow necks of land, and from the general level of the remnants of the once continuous plateau one descends to flat, swampy bottoms by steep precipitous slopes of 20 to 50 meters. On these bottoms some attempt is made to cultivate rice in some places. In other localities the blue clay soils of these bottoms are too wet and swampy to admit in their present condition of any cultivation whatever.

When the conditions of soil and climate are considered it is seen that they are very favorable for the cultivation in Sorsogon. Province. The natural conditions are so favorable, with some minor exceptions, that with the proper adjustment of transportation facilities and labor conditions the cultivation of abacá should become a far greater source of revenue than at present.

SAMAR.

In this province only very limited opportunity was given to observe the abacá soils. The capital, Catbalogan, as well as the city of Calboyoc, are probably the most important shipping points for the abacá produced on the island. But little abacá is produced near these cities, the supply coming from the hills in the interior. There are practically no roads on the island, so the abacá is carried down the rough trails to the larger rivers and from there shipped to some of the larger towns for reshipment to ports where large vessels touch. The finest quality of abacá is said to be produced in the northern part of the island, but a good quality of fiber is produced in the hills along the Gandara River. There are many good abacá-producing districts, but the transportation question is often a serious one, on account of lack of roads. The country is sparsely populated, and its unsettled condition for the past few years has seriously operated against the attention being given to the cultivation of abacá that it deserves, so that many plantations have been allowed to grow up in jungle. Very recently, however, more abacá is being prepared and is coming to the markets in considerable quantities.

On the west side of the island there is considerable uniformity in the soils. In the hills about Catbalogan for several miles eastward from the coast the soils consist of heavy yellow clay loams that are underlaid by a yellow clay loam of heavy texture. At a depth of something over 2 feet the clayey subsoils grade into a loose sandy mass of decomposing rock. These soils easily become compacted, rendering them impervious to the ready passage of rain water. In the narrow trails this clay becomes during the periods of greatest rainfall wet and slippery, making travel over them dangerous and at times well nigh impossible. These soils in large areas are at present only used for growing small patches of corn, upland rice, and sweet potatoes. They are apparently derived from calcareous sandstones, although granite of fine quality and texture is found in the central part of the island, and has been reported as giving rise to similar clayey soils. Along the western coast, in the neighborhood of Catbalogan, limestones crop out and the soils are heavy clay loams and clays. On the east coast of the island the soils, instead of being heavy clay loams, are reported to be more loamy in character, and correspondingly more rich and fertile. Consequently, on the east coast of the island cultivation of the land is carried on to a greater extent, and extensive rice fields are found, as well as some sugar cane. Much of the island consists of unbroken forest, and many years must elapse before any great headway can be made along the lines of successful agriculture.

LEYTE.

From Leyte a fine quality of abacá is shipped, and for many years the island has enjoyed the reputation of being one of the foremost abacá-producing districts of the entire archipelago. The finest quality of abacá is probably that produced in the extreme southern part of the island, in the hilly region adjoining Malitbog Bay. The northeastern part of the island has for a long time also been known as a fine abacá region. In this section of the island the greater part of the abacá grown is found on long, gently rising lowlands, sloping gradually back to the mountains in the interior of the island. In none of the abacá-producing regions mentioned so far has the cultivation of abacá been successful on such land, but the level or sloping lands are the rule in northeastern Leyte. These lands are not marshy, but are said to be cool and to possess the abundant rainfall and moisture upon which the plant thrives best with the limited cultivation it receives. The soils of this section of the island, while not clayey, are heavy silt loams, and from their texture and composition would make excellent sugar lands except for the prevalence of immense numbers of locusts at times. These silty loams are alluvial in origin and are rich, fertile, and of considerable depth. Further inland there is a gradual transition to more sandy soils, until the heavy silty soils are entirely replaced by heavy sandy loams, better adapted to producing a finer quality of fiber, but with a greatly diminished yield. The sandy loam soils possess heavy sandy loam subsoils, and in places there is a slight admixture of gravel. The character of the sand and gravel is that of water-worn and water-deposited material, and unlike the sharp sands and gravels of Albay Province. The sands and gravels are undoubtedly derived from rocks of volcanic origin, for it is a well-known fact that there are several old volcanic cones in the center of the island. From the abacá regions in the northeastern part the extracted fiber is packed on carabaos to the nearest coast towns and shipped from there in small sailing vessels to Tacloban or Carigara. At these ports it is assorted, repacked, and baled or shipped direct to Manila by large steamships. The mountainous island Biliran also belongs to this province, and abacá is produced in considerable quantities on the entire island.

OTHER LOCALITIES.

In addition to the provinces just mentioned there are many other islands or parts of islands where considerable abacá is cultivated, and where large sums of money are realized from the sale of the extracted fiber. Up to the present there has been no opportunity to study the soils of these localities, so little more than mere mention can be made of these districts.

Marinduque, one of the smaller islands just west of Tayabas Province, has long been noted for the fine quality of extra white abacá produced. The fiber is short, but of a quality well adapted for weaving purposes. The surface of the island is rough and mountainous, and the large mountain in the extreme southwestern part of the island is undoubtedly an extinct volcano.

Mindoro, the large island just south of Batangas province, annually exports a small quantity of abacá fiber. The island is sparsely settled, but the cultivation of abacá is said to be increasing each year. The surface of this island is quite rough and broken, and there are many high mountains, the most noted of which is Mount Halcon.

Masbate produces limited quantities of a fair quality of abacá. The island is rough and mountainous, and the cultivation of this valuable fiber could be considerably increased.

Panay.—Only small quantities of abacá are exported from Panay, and this not of a good class, as the fiber is inferior in quality and of short length. The largest shipments of abacá from the island are probably those from the province of Capiz.

Negros.—In this island the cultivation of sugar cane takes first rank, but considerable abacá is also produced. The southwestern part of the island is said to be the part producing the greatest quantities. In middle Occidental Negros some abacá is raised. The hills are all far inland, near the lower slopes and foothills of the central chain of mountains, at an approximate elevation of 300 meters above sea level. In some localities abacá is found growing on reddish gravelly soils. These soils consist of heavy loams and contain much sandy, broken rock rather than water-washed river gravel. These locations are on the summits of outlying foothills. The fiber of the abacá grown in these soils, while of short length, brings a good price on account of its extra quality. Again, in the same part of the island abacá is grown to some extent in virgin forest, in dense shade, on the lower slopes of the mountains. In these locations the yellow clay soils were overlaid by two or three inches of black decomposed vegetable mould. The shipment of abacá from the entire island is small as compared with such provinces as Albay, Sorsogon, Samar, and others.

Cebu.—A large amount of abacá fiber is exported from the city of Cebu that is produced elsewhere, as, for example, much of the abacá grown on western Leyte. The total shipments made from this point during the year 1900 were less than one-tenth of that from the province of Albay. The cultivation could be greatly increased and shipments made direct from Cebu to foreign ports of the rebaled and assorted fiber, thereby saving the cost of reshipping in Manila.

Mindanao.—From this large and important island large quantities of abacá are annually exported, and by comparing the number of kilos exported during the year 1900, as given in the Monthly Summary of Commerce and Finance, it is seen that the figures about equal to those of Ambos Camarines and Samar provinces. In the northern part of the island abacá is largely cultivated, as well as in the southwestern part. In the southwestern part the abacá is grown on soils of alluvial origin; that is, they are the result of the overflows and deposition of the sediment carried by the streams. They are rich, heavy loams, composed largely of silt, with a high percentage of decomposed organic matter. The lands occupied by these soils are nearly level, sloping very gently to the seaward. Abacá is cultivated to the water's edge along the coast. In soils of such natural richness and fertility as these the natural tendency would be to a rank and rapid growth of fleshy plants, although the quality of fiber would not be of a high grade.

Basilan and Jolo.—In these two small islands abacá is also cultivated to some extent. The sites chosen for abacá are low places of much the same character as in southwestern Mindanao. It is rarely grown in the hills, but in low areas that have rich silty soils of alluvial origin.

CULTIVATION.

In many parts of the archipelago, especially in southern Luzon, new sites for the cultivation of abacá are selected on the slopes, where the wild plant is found growing. In other districts localities are selected on account of some especial fitness for the plant. Growing in its wild state from central Luzon to southwestern Mindanao, the abacá almost without exception chooses for its habitat the slopes of mountains and hills, where the natural conditions are conducive to a moist and cool atmosphere.

In preparing the land the greater part of the original forest trees are felled. A fair proportion of trees is left for shade, but the writer believes that the necessity for protection from destructive windstorms is even greater and more essential than from the rays of the sun. Undoubtedly the young abacá plants need some protection from the heat of the sun; but after the field is once started the protection from heavy winds is of paramount importance.

Holes are dug at intervals of a few feet, and the suckers or offshoots of old plants are set out. Suckers are generally used in starting a new plantation, on account of the length of time needed for the plant to mature from seed. Generally, at the time of planting, sweet potatoes are planted to prevent the land from washing and to offer some shade and protection to the tender plants. Frequently rice and even sugar cane are planted for the same purpose, although sweet potatoes are generally preferred. Three years are usually required for the plants to arrive at maturity. After the plants once come to maturity the fields can be cut over every few months, the usual way being to cut the ripe plants twice a year. Only the larger stalks are cut from each bunch of stalks, as in this way but little injury is done to the remaining stalks. When all of the stalks are removed, the hot sun injures the young shoots, and often two or three years are required to get the plants in a thriving condition again. The plants are said to be ready for cutting when the large bud makes its appearance. Little cultivation is practiced other than to destroy with the bolo the dense growth of weeds and grass that springs up every two weeks. In regard to the shade trees scattered about the abacá fields, frequent mention is made of "good" trees and "bad" trees. Usually those trees are considered "good" that will allow the abacá plants to maintain a vigorous growth to within a very short distance of the trunk of the tree. Under the "bad" trees the abacá plants look sickly, and do not thrive within a radius of several feet of the trunk. In many localities the Dapdap tree (a species of Erythrina), as it is called in the Bicol language, is considered an excellent tree. Usually a tree is considered good when it has small leaves that soon decay on the ground and do not form a mulch thick enough to injure the growth of the plant. Any leguminous tree would be classed as a good tree, for not only would it help to enrich the soil by adding some store of nitrogen, but it would serve as a shelter from the heat of the sun and protection against the strong, heavy winds.

In some localities, where the conditions for rapid growth are especially favorable, the ground is thickly covered with the growing stalks. Again, in more sandy soils, where the supply of plant food is much less, the number of stalks is less and they are of correspondingly shorter lengths. In some districts the length of fiber extracted, which closely approximates the length of stalk, is 5 meters and sometimes more. Again, the length may average in some districts less than 2 meters.

EXTRACTING THE FIBER.

Usually before the plants are sufficiently ripe for cutting and extracting the fiber the fields are carefully cleaned of all surplus weeds and grass. The stalk of the ripe plant is cut close to the ground with a bolo and the outer leaves stripped off. The stalk consists of leafstalks, which closely overlap each other, forming the apparent trunk of the plant. These leafstalks are pulled off one at a time, and from them the laborer removes the outer portion of the sheath, which contains the valuable fiber. To remove this outer sheath from the rest of the fleshy leafstalk a small knife is driven through the leafstalk, and when so loosened at the base the entire sheath can be readily torn loose from the fleshy part, which is thrown away. Frequently a sharpened piece of bone one-fifth of a meter in length serves the same purpose. Again, in other localities, the leafstalk is turned over and a diagonal cut made across the fleshy part, which loosens the outer sheath so that it can be torn loose from the undesirable part.

As the outer sheaths containing the fiber are removed they are carefully straightened out until the entire plant has been so treated. After a large number of stalks have been so treated the pile of outer sheaths are ready for removing the fiber. This should be done at once, otherwise the strong juices of the plant readily discolor the fiber, although the process of extraction is rendered much easier. The fiber is removed by drawing the section of outer sheath under a knife with sharp teeth, which separates the fiber into a greater or less number of strands, according to the fineness of the knife. When the finest quality is desired the blade of metal pressing on the firm block of wood is without teeth, but ordinarily a toothed knife is used. The teeth are separated from 1 millimeter to 1½ millimeters apart, but the farther apart the teeth the less the labor required to draw the sheath through and the coarser the fiber. The machine for extracting the fiber is a crude affair. The knife is set in a wooden handle and so arranged that it is raised and lowered by means of a lever arrangement worked by the laborer's foot. It is so arranged that it presses with considerable force on the piece of wood underneath.

It has been variously estimated that from 20 to 25 and even 30 per cent of the fiber is lost in the process of extraction by this method. From this refuse a fair quality of paper can be manufactured. By drawing the cleaned fiber through the knife a second time a much finer and whiter quality of abacá can be obtained, but the loss is correspondingly greater. The average laborer, working sixteen hours per week, will extract from 20 to 45 kilos of abacá fiber, 30 kilos being taken as a fair average for the week's work. After the work of drawing the fiber through the knife it is hung on bamboo poles or on lines to dry. The work of harvesting is carried on during the entire year; the work of drying being necessarily hindered during the rainy season, hence the production is not so large at that time. At the end of each week the laborer collects the dried abacá into a loose bundle and transports it to the large buyer.

In the larger cities in each district there are usually warehouses that buy and repack abacá for shipment to Manila. In these experienced men sort the fiber into three or four grades and pack it in bales of uniform weight and size. The repacked bale weighs 125 kilos and is securely bound in nipa palm tied with bejuco. Frequently shipment is made of the loose bundles or braids of abacá to Manila direct, where the work of assorting and repacking is carried on. Three grades are recognized and the fiber baled accordingly and marked with some letter or symbol to designate it. In addition to these grades there is occasionally a fourth or superior grade recognized, which represents only the very finest and whitest abacá. But little of this is secured in the large amounts of abacá that comes to the warehouses. Besides these grades the natives, by a careful selection of the plants and attention in extracting the fiber, get out a certain quantity of very fine abacá fiber called, in certain of the dialects, lupis. This is mixed with other fibers and materials and finds ready sale for weaving into the different kinds of cloth so highly regarded by the natives.

The warehouses must be well-constructed buildings with dry floors and ceilings, to guard against dampness.

CLIMATIC CONDITIONS AND CONCLUSIONS.

While the number of stations recording the rainfall and temperature conditions of the principal abacá districts is small, still there are some features brought out by these records that deserve mention. The climate, for the greater part of the regions of the archipelago at present known as abacá-producing districts, is not characterized by a pronounced wet and dry season, as is western Luzon and Panay and Negros. In these districts the distinction is decidedly marked. There, according to tables given on page 225 of Volume IV of the Philippine Commission Report, from three to ten times as much rain falls during the wet season as during the dry season. On the other hand, in the regions producing the greater part of the abacá exported, the rainfall of one period of the year nearly equals that of the other six months of the year. In Albay, one of the greatest abacá districts in the Philippines, one frequently hears the remark that the rainy season lasts the entire year. The rainfall exceeds 2,960 milimeters (118 inches), and while some portions of the year receive more rainfall than others, yet rarely does a week pass without a heavy shower. Little provision is made by the natives to store the water supply, and when a period of two weeks elapses without rainfall the people are subjected to great inconvenience for their water supply. While the rainfall of this province is greater than of any other of the abacá localities, still it is distributed quite uniformly throughout the entire year.

It is this regular distribution of the annual rainfall that controls in a great measure the development of the abacá industry in the Philippines, and with the present system of cultivation it is to be doubted if the industry could be introduced in other sections of the archipelago where the wet and dry seasons are pronounced, unless a radical change is made in cultivating the plants. A period of six weeks drought will affect the character of the abacá plant considerably, but will not inflict serious damage; but longer periods of extremely dry weather injure the fiber as well as the rapidly growing young plants. Frequent rains, sufficient to keep the soil cool and moist, and heavy dews, which often are as effective as light showers, are the requisites of the climatic conditions best suited to the successful development of the plant. Rich, heavy, sandy loams are to be preferred over other soils, for these allow the ready percolation of the rain waters through them, and the free circulation of the air so necessary to keep soils in good condition. Soils covered with large bowlders are to be avoided as much as heavy, close, impervious clay soils. Sloping lands that are so situated as to be, on account of their location, free from destructive winds, are much to be preferred rather than flat lands.

As to the question of cultivating the soil to conserve the moisture, and the planting of leguminous crops to increase the supply of nitrogen in the soil, besides adding large stores of organic matter, these are questions that at the present are altogether untried. Much can be done by proper cultivation of the soil, selection of those varieties of plants that are known to yield a fiber of a superior color and strength, pruning of unnecessary suckers, so as to allow only the best plants to come to maturity, more careful judgment of the best time to cut the plant, attention given to the ability of the soil to mature no more plants than can be done with the best results as to quality and length of fiber, etc. These are some of the matters that need careful attention in the future development of the industry. The question of fertilizers is an altogether unknown field. No attention has been paid to them, hence it is not known whether the soil is so exhausted that the application of limited amounts of fertilizers would sufficiently increase the yield to justify their application. In many areas the fields have been cultivated for scores of years, and certainly the original supply of plant food is greatly diminished; but the question of the cost of fertilizers and the increase in yield can only be determined by experimentation along careful lines. The question of shade and protection trees needs consideration. It should first be demonstrated that they are essential; next, the number and character of trees best suited to the plant should be determined, and an effort made to introduce only such trees as are beneficial instead of choosing at random certain trees, to be left standing when new lands are cleared.

Given the proper cultivation and selection of areas suitable for the growth of the plant, it yet remains to be seen whether or not the industry can be profitably introduced in other parts of the archipelago. While suitable soils can be found, the climatic conditions are averse in large areas of the islands; but with the abundant and cheap water supply for irrigation that exists in so many districts and cultivation that will help maintain suitable moisture conditions, not only during the dry seasons but the wet seasons as well, the industry might be introduced in many districts and become as great a source of wealth to the people as in the provinces where it is already cultivated.

The question of extracting the fiber is an important one, and has received considerable attention for many years. Frequently new machines are invented that apparently have solved the problem; but all are eventually given up, and at present the old primitive methods are the only ones employed. The percentage of loss is so great that some provision should be made to utilize the refuse that accumulates on account of the present crude method of extraction, or apparatus constructed that will minimize the percentage of loss.

The market conditions of the crop need to be carefully looked into, if the best interests of the industry are to be closely watched.

An industry is neglected when as much money is paid for an inferior article as for one of superior quality, simply because by cheap methods of manipulation the large buyer can palm off his goods as first class. This is often the case with this industry. As much is paid for second-grade fiber as for the first grade, for the manufacturer can, by cheap chemical methods, whiten the colored fiber, and, while equal in appearance to the finer quality of fiber, the bleaching process has greatly weakened it, thereby destroying its usefulness. Doctoring by unscrupulous methods has made many products of the Philippines fall into bad repute in the markets of the world. It is to be hoped abacá will not increase the list.

EXHIBIT X.

CORRESPONDENCE BETWEEN THE SECRETARY OF THE INTERIOR AND DR. S. A. KNAPP, SPECIAL COMMISSIONER OF THE UNITED STATES DEPARTMENT OF AGRICULTURE, RELATIVE TO CERTAIN AGRICULTURAL MATTERS IN THE PHILIPPINES.

In October, 1901, Dr. S. A. Knapp, special agent and agricultural explorer for the United States Department of Agriculture, visited Manila, and while here the secretary of the interior addressed him the following letter, making certain inquiries relative to agricultural matters:

OFFICE OF THE DEPARTMENT OF THE INTERIOR,
Manila, October 23, 1901.

Dr. S. A. KNAPP,
Special Commissioner United States Department of Agriculture,
Manila, P. I.

SIR: Knowing that you have spent some time investigating the methods used in rice culture in these islands, I should be very glad if you would give me the results of your observations, with such criticisms as may occur to you on the methods at present in vogue.

Will you further be kind enough to furnish me such information as you are able to give in answer to the following inquiries:

Do you know of other varieties of rice which would be more suitable to the soil and climatic conditions here, or which would produce larger crops than the varieties at present grown? If you know of any such varieties, will you state whether or not they require irrigation, and if not, how they should be cultivated; also how many crops could be grown in a year?

What experience have you had in the use of steam plows and other heavy machinery in the growing, harvesting, and milling of rice in the United States? What types of plows, harrows, seeders, and of harvesting, threshing, and cleaning machines would you recommend for large producers in this country? What types would you recommend for small producers? Can you state where the necessary machines and implements can be purchased, and give approximate prices?

What is your opinion as to the practicability of using horses or mules for plowing here? Do you know of any rice which would furnish a straw that would make good forage for horses and mules? Do you know of any rice the grain of which might be used advantageously as a substitute for oats in feeding horses and mules?

Will you state what has been the result of your search for suitable land on which to grow alfalfa, and describe the methods of cultivating and curing which you believe would be likely to result most successfully? How much of an annual crop per acre of alfalfa could reasonably be expected from our best land? What is the cost of suitable baling machinery and where can it be purchased to the best advantage?

Any further practical information you may be able to give me with reference to rice and alfalfa growing will be highly appreciated. Can you give me names and addresses of reliable dealers in nursery stock or seeds in the far East?

Thanking you in advance for your trouble in replying to these questions, I am,

Very respectfully,

DEAN C. WORCESTER,
Secretary of the Interior.

Replying to the above Dr. Knapp said:

SIR: It affords me pleasure to acknowledge receipt of your communication of October 23, and to make such replies to your several questions as I am able.

My experience demonstrates that rice is no exception to the law of plant growth, to wit: That the introduction of high-bred seed from other countries tends to increase the quality and quantity of the crop. Japan rice seed has considerably increased the product per acre in the United States. It will not do, however, to order Japan seed at random. There is much inferior rice in Japan. The rice should be carefully selected seed from the island of Kiushu, and may be obtained from E. H. Hunter & Co., Kobe, Japan. If you mention me Mr. Hunter will know what quality is desired. The straw of this rice makes good coarse fodder for horses and mules. The flavor is excellent and it contains considerable nourishment. I regard it equal to hay made of wild grasses. I would also advise the trial of some of the best rices of Siam.

It is not advisable to attempt to grow rice without irrigation. With dry cultivation it costs too much to keep the weeds out of the crop, the rice does not mill well, and the yield is less. With artificial irrigation two crops can be produced annually in these islands. It is done in south China. If irrigation depends solely upon the rain falling upon the land to be flooded, it is doubtful if more than one crop of rice can be raised in a year.

In the present condition of rice lands in Luzon, it will be found more profitable to raise one crop of rice annually, and one crop of cow peas, or some other leguminous plant, to be plowed under green as a renovating crop. Thus managed, the one crop of rice will about quadruple the present yield.

I have had considerable experience with steam plows in the State of Louisiana. We found rice lands were too soft for the use of a traction engine, and we were obliged to use stationary engines with wire cables. The cost of engines and plows, coal, engineers, and plowmen, the delays in the case of breakage owing to our distance from repair shops, made the plowing cost us about three times as much as if done with horses and mules.

Engines heavy enough to run the plows were too ponderous for harrowing, seeding, and harvesting. Steam plowing, in my judgment, can only be used profitably on very large fields of well-drained land. We have used many oxen. Fifteen years ago they were in general use in Louisiana. To-day they are seldom used in rice fields. Horses and mules have universally superseded oxen in sugar and rice farming. As soon as the rain has softened the soil enough for plowing, set the plows going. In every case plow and work the land dry as for wheat. The yield is better and the quality is better. We use four mules or four horses abreast on a gang-riding plow, using 8, 10, or 12 inch plows, according to stiffness of soil. We expect each man to plow 3 to 4½ acres per day, according to size of plows.

This transplanting of rice by hand is all nonsense. Work the land dry. Harrow well and plant with a force-feed disk drill. The harrows and drills are the same as those used for wheat.

A harvester can be used on any land that will bear up a horse. Draw off the water about ten days before the rice is fit to cut. Use the rice harvester. Shock the grain as you do wheat. The steam-power thrasher can be used, or the sweep power, or endless tread. Bale the straw as thrashed.

Very small farmers may use a 6-inch single-pony plow and a light harrow, and plant with a hand drill. A garden drill will do, but a broom-corn drill would be better. A larger farmer could use two horses and an 8 or 9 inch plow. Probably small farmers had better cut their rice with a cradle.

Prices of farm machinery in the United States.

6-inch plows	$3.50–	$4.00
8-inch plows	6.00–	8.00
Gang plows, riding, about	40.00–	45.00
Gang plows, not riding, about	16.00–	20.00
Disk harrows	15.00–	18.00
Smoothing harrows	5.00–	10.00
Force-feed disk drills	70.00–	80.00
Hand drills	6.00–	15.00
Harvesters	120.00–	150.00
Steam thrashers, complete	1,200.00–	2,000.00
Horse-power thrasher	500.00–	600.00
Cradles	2.00–	5.00
Iron baling machines	175.00–	200.00

For full description of machines and prices, address the Lake Charles Carriage and Implement Company, Lake Charles, La.

There is a soft rice, known as Egyptian or bull rice (i. e., rice fed to bulls), which produces enormously and is used to great advantage, fed in the bundle, the same as oats, or thrashed. I can furnish a carload of this seed if notified soon. I do not know of any other source from which it can be obtained pure.

I note that I have not answered your question on milling. All you require for cleaning rice is some simple machinery—an Engleburg huller, a small sweep power, and a fanning mill. These will answer for the country. Other machinery may be added if desired. Nearly all rice-milling machinery can be obtained of the Squire Rice Machinery Company, Buffalo, N. Y.

Almost any tract of land that will produce good sugar cane will do for alfalfa. There are many good tracts near the Laguna de Bay; but the most favorable, so far as I can judge, is the black sandy loam lands about Angeles, Tarlac, Magelland, etc. In fact, all the table-lands from San Fernando north appear favorable.

Prepare the ground as for a wheat crop and sow broadcast 40 pounds per acre. Sow early in November, just as soon as the heavy rains are over. These directions apply to all forage crops. If sown in the spring the heavy rains and hot sun ruins the stand, if it does not kill the plants completely. Alfalfa on good land can be cut three or four times, yielding 6 to 8 tons of superb hay in the year.

The main difficulty will be in curing during the wet season. In the dry season I apprehend little trouble. In the wet season I would advise using bamboo mats raised 6 or 8 inches from the ground and canvass hay caps. By using a tedder the crop can generally be dried enough so it will not spoil in the cock, placed on a mat and capped with canvass. However, experience must settle such questions. As soon as cured it should be baled.

Besides alfalfa there are a number or promising fodder plants; Hagi, or Lespedeza, highly recommended by the Imperial Agricultural College of Japan; Panicum cruscalli (like millet); winter barley, sown in November and cut in the dry season; Panicum colonum, cut early; Astragulus latoides.

L. Boehmer & Co., 28 Bluff, Yokohoma, Japan, is one of the largest and most reliable dealers in nursery stock and seeds in the Orient. He mainly produces his own stock of seeds.

Hoping these answers may be of service to you, I remain,

Very respectfully yours,

S. A. Knapp,
Special Commissioner, United States Department of Agriculture.

Hon. Dean C. Worcester,
Secretary of the Interior.

Exhibit Y.

REPORT BY DR. S. A. KNAPP TO THE SECRETARY OF AGRICULTURE OF THE UNITED STATES ON HIS OBSERVATIONS IN THE PHILIPPINES.

Hongkong, China, *October 31, 1901.*

Sir: In accordance with your instructions, I went to the Philippine Islands, arriving at Manila on October 8, and at once presented your letter of introduction, and one from the honorable Secretary of War, to Governor Taft and to General Chaffee. They received me very cordially and furnished me every facility in their power to prosecute my investigations.

The work assigned me may be outlined as follows: (1) To inquire into the present supply and food value of the grasses and forage crops now produced in the Philippine islands; (2) to investigate the possibility of producing there grasses and forage crops of higher flavor and greater nutritive value than those now grown; and (3) to ascertain the feasibility of converting these better grasses and forage plants into hay for the use of the American horses and mules now in those islands.

General Chaffee informed me that he had issued an order to the effect that hay should not be issued for the army horses and mules in Manila and vicinity, but that they must be grazed where practicable, and where not, must be fed the local forage, which consists of the wild native grasses grown on the alluvial lands around Manila and along the Pasig River, cut and delivered in Manila daily by the natives, and that in the provinces army horses and mules should receive only half rations of American hay. He explained that in many cases full rations of grass could not be obtained in the provinces, owing to the wooded and mountainous character of the country.

General Chaffee thought the animals were doing very well under this treatment, and he suggested that more immediate relief could be secured by introducing better grasses and forage plants, and allowing the native farmers to cut them green and deliver, as they were accustomed to this method and it was difficult to get them to adopt new ways of doing things. Besides, the climate allowed the use of green food all the year. I suggested Guinea grass. He said it was excellent; he had fed it in Cuba. I also mentioned soft rice, which could be grown on the lowlands about Manila, cut just before ripe, and fed as sheaf oats. This he thought would be a valuable addition. The feasibility of producing alfalfa and other fodder plants was fully discussed. I conferred with the general in detail on account of his excellent judgment and his large experience in the care of horses and mules in tropical countries.

By inquiry of army officers I learned that rice straw and paddy rice (rice in the husk) had been fed to horses. Lieutenant Crockett informed me that while scouting in northern Luzon he fed his horse for two months on rice in the sheaf and that the animal did well. At the Government farm near Magalang, Pampanga Province, between two and three hundred American horses are in pasture for recuperation, and I observed that they and the work animals on the farm were fed a low-grade paddy rice costing 1 cent per pound. The post officer was not clear that there had been time enough since the trial commenced to clearly determine its relative value as a food for horses. Grass and rice are the only fodder plants produced in the Philippines.

I deemed it of primary importance to ascertain the character of the lands in the vicinity of Manila. To this end I spent two days in driving over them. They are heavy clay loams but a few feet above the level of the sea, with scarcely any drainage and liable to be flooded from the Pasig River in times of high water. The grasses produced on them are such as will thrive under these conditions. If cut when from 15 to 24 inches high, and fed green, these grasses are eaten with fair relish and evidently contain considerable nutriment. If allowed to mature for hay they become woody, harsh, and unpalatable; in fact, actually injurious to American horses and mules. No sweet grass can be produced. None of our best grasses and forage plants will live under the conditions prevailing. Along the Dagupan Railroad, within 6 miles of Manila, the lands are several feet higher. There are also some slightly higher lands along the Pasig River near its union with the outlet of Lake Bay. Around Lake Bay, or Laguna de Bay, are large areas of high, well-drained, sandy loam land, on which sugar cane grows well. Without trial, I take it for granted that any land which will produce good crops of sugar cane is adapted to the better tropical grasses and forage plants, because sugar cane will not thrive on poor soil and under poor drainage. The lands about Calamba impressed me very favorably. Owing to the typhoon, I was not able to give them the careful inspection I desired. The advantage of using lands contiguous to this lake is the cheap transportation to Manila by boat.

Along the railroad from Manila to Dagupan the land becomes suitable for some better grasses within 6 miles of Manila. After crossing the Rio Grande there appears to be a radical change in physical conditions. The land is higher and susceptible of good drainage. Sugar cane is one of the principal crops. The soil is sandy loam. From San Fernando I drove to Bacolor and looked the country over generally. There is a large body of rich sandy loam land intersected by many small runs and creeks, giving excellent drainage. Still farther north, around Angeles, I struck a large body of black, sandy loam table-land, said to be 300 feet above the sea. It so favorably impressed me that I decided to give it careful inspection. I presented my letters to Capt. A. T. Macomb, the commandant at Angeles, and he kindly furnished me transportation and accompanied me. We drove between 40 and 50 miles in the vicinity of Angeles, Tarlac, and Magalang, and found the country practically uniform. In places I was able to obtain a view of a vertical section of the soil. It was deep and free from hardpan. The soil showed in places 8 to 10 feet in depth. It produced excellent sugar cane. Later some of the older merchants of Manila informed me that the sweetest cane in Luzon was produced about Angeles and Tarlac. Still the land was not such light sand that rice could not be produced upon it. All the crops in this section were as good as the best I saw in the island. Five miles west of Tarlac I stopped four hours at the hacienda of Rafael Gil. Mr. Gil was educated in Europe and is well informed on agricultural subjects. He fully confirmed my conclusions. He said he produced excellent crops of sugar cane, cotton, corn (maize), tobacco, and rice. The lands of his hacienda (6,000 acres) are mostly undulating, and the fields are of good size. Many tracts could be irrigated from mountain streams. American haying machinery and other agricultural implements could be used successfully on the lands in this section. I consider this the most favorable section for hay farms along the Dagupan Railroad.

I did not visit Benguet Province because the government road has not been completed, and, to make the inspection, I should have been obliged to ride horseback about 150 miles, mostly along mountain trails and across streams by fords. This is rendered difficult and hazardous in October by reason of the heavy rains and typhoons. General Chaffee advised strongly against the attempt. I changed my plan the more readily because it would be impracticable without a railroad to transport hay or forage so great a distance to market. I obtained, however, from intelligent army officers, who had been in all parts of the province, a full description of the topography and natural products. On the elevated plateaus of that province almost anything can be produced that will thrive in New York and Pennsylvania. On some of the more elevated lands there are occasional frosts in winter, while the summer heat rarely goes above 80° F.

For cutting and feeding green, I suggest the following plants as practically sure to succeed on well-drained, fertile, sandy loam land:

1. Guinea grass, whose merits include excellent flavor, high nutritive value, and an enormous yield per acre. Furthermore, it has been fully tested in Cuba, Porto Rico, and other tropical climates, and will succeed on quite heavy clays if drainage is good.
2. Alfalfa. Where conditions are favorable this is recognized as the chief of fodder plants, but it will not succeed on lands that are low and heavy, or in which water stands near the surface even for a short period during the year.
3. Hagi (*Lespedeza bicolor*). This is highly recommended by the Imperial Agricultural College of Japan. If cut young it is similar in flavor and nutritive value to alfalfa; but it is if possible a more vigorous grower. Conditions for growth are similar to those required for alfalfa. It has been tested in Formosa by the Japanese Government and found a success.
4. Other forage plants. There are a large number of excellent fodder plants that will succeed on almost any well-cultivated land in the Tropics; for example, the fodder pea (*Pisum sativum*), *Pueraria thunbergiana*, *Panicum crus-galli*, cowpeas, sorghum, indian corn, etc. On wet lands, soft rice, sown thickly and allowed to nearly mature, ranks well up to sheaf oats, and it has the advantage that cutting does not kill the root, and a second crop can be cut in a few weeks. This, however, is true of sorghum and many other plants under tropical conditions.

For hay I recommend alfalfa, Hagi, Mexican bur-clover (*Richardsonia*), and for some places crimson clover. It is too difficult to cure and preserve for hay such plants as sorghum, indian corn, and cowpeas to permit the consideration of them as hay crops in tropical countries.

From a practical standpoint the most difficult part of the hay problem in the Tropics is not to designate suitable plants for hay and select soils adapted to their cultivation, but it is how to cure hay and preserve it sweet when cured. In southern Luzon the dry months are December, January, February, March, April, and generally the first half of May. While there is a slight rainfall during these months, the conditions are more favorable for making hay than in most of the States of the United States during the summer months. In the so-called rainy season, extending from the middle of May to the close of November, the rain is by no means continuous nor daily. It is my opinion that by the use of hay caps, and possibly bamboo mats, to keep the haycocks from absorbing moisture from the earth, alfalfa and the clovers could be secured in most months of the rainy season. There are occasionally periods of such continuous rains or such rapid succession of showers that it would be impossible to cure any kind of forage plants. Under such conditions the crop could be placed in a silo and shipped to Manila by boat as required. Silos are a success in the Tropics. As soon as cured, hay should be baled to prevent molding in the stack or mow.

There are some minor difficulties which must be met and overcome. There are no teams suitable for the hay industry. I take it for granted that the army requires all the horses and mules it now has. The native pony is too small and vicious to be considered. The carabao is too slow and clumsy, and besides nearly three-fourths of all these animals in the islands have been lost by rinderpest the past year, so there are not enough animals to raise the ordinary crops, and they are held at prices beyond all reason. A carabao that formerly sold for $12 or $15 (gold) will now bring $60 to $70. In north China is a strong, blocky, and hardy breed of horses well suited to farm work. They can subsist on native grasses and do almost any amount of work. Many of them are excellent roadsters. They are used for carriage horses in the cities of China and Japan and are well liked. They can be purchased in Shanghai at from $20 to $50 each, and in the interior at a much lower price.

I do not think the native can be depended upon to make the hay. He does not understand it, and is slow to adopt new methods. If a feast day came, or a cock fight occurred, he would let a crop of hay spoil before he would work. If an experiment farm could be established under the auspices of the insular government or the United States Department of Agriculture, with a practical farmer in charge to investigate these and other agricultural questions, it appears to me enough American farmers would be attracted by the high price of hay in Luzon to take up hay farming as a business there, and a supply would be furnished. The rainy season is not the same in all portions of Luzon. Some sections get their rain during the southwestern monsoon and others during the northwestern monsoon. The rainy season does not commence in the latter till October. By having hay farms in the different districts hay could be made somewhere at all seasons. Distance from Manila in this case would not materially affect the economy, because the transportation would be on ocean vessels.

In addition to a supply of hay, the grain necessary for the work animals and the army horses should be furnished from these islands. Indian corn does very well. Not only were reports favorable, but I saw evidence of the fact. No one could tell me how much they produced per acre; but, judging from what I have seen in Mexico in the same latitude and altitude and under almost precisely the same conditions, I should say that, with good farming, a crop of 40 bushels per acre could be produced. Two crops of corn per year and a crop of cotton were produced in Mexico on the same land in one year. Tropical corn is a much better horse food than northern corn. Egyptian or soft rice furnishes a grain that ranks close to oats as a horse food, if ground in the paddy. Irrigated and well farmed, it will give two crops per year in Luzon, yielding 60 to 80 bushels per crop, and a ton and a half of straw. Paddy rice and corn, mixed half and half and ground, would make excellent horse or cattle food.

In presenting this report I have aimed to avoid anything of a doubtful, experimental nature, and adhere closely to well-attested facts. In closing, I can not emphasize too strongly the importance of taking hold of the hay and grain business in the Philippines in a practical way. There are no doubtful questions nor insurmountable obstacles involved.

Respectfully,

S. A. Knapp,
Special Agent and Agricultural Explorer,
United States Department of Agriculture.

Hon. James Wilson,
Secretary of Agriculture.

Exhibit Z.

CIRCULARS NOS. 2 AND 3 AND ACCOMPANYING LETTERS, WITH THE ANSWERS FROM TWO CORRESPONDENTS, ILLUSTRATING THE CHARACTER OF THE REPLIES.

Sir: The bureau of agriculture is now established, with its principal office in the city of Manila, and is ready to furnish such assistance to planters and farmers throughout the Philippines as is consistent with the acts of the Civil Commission, under which it is organized.

Upon request, small trial quantities of field, forage, and garden seeds will be supplied to farmers and teachers who will undertake to plant the same and report to this office the success or other result that may follow the planting of each kind sent to them.

As a further means of promoting the highest interests of general agriculture throughout the islands, and to afford this bureau the opportunity to become familiar with the existing conditions and needs of the farmers and planters, attention is called to the following list of questions, with the request that you kindly answer the same as best you can, or submit them to some intelligent farmer who will do so. The replies may be made either in Spanish or English.

In addition to replying to the questions, any remarks or observations that you may add upon the general agricultural conditions prevailing in your vicinity will be greatly appreciated, and, if published by the bureau, you will be duly credited for information furnished.

An addressed return envelope, which requires no postage, is inclosed for transmitting the reply to this office when filled out.

Respectfully,

F. Lamson-Scribner, *Chief.*

Insular bureau of agriculture.—Circular No. 2.—Inquiries relative to agriculture in the Philippines.

1. What fruits or field crops are grown in your municipality? What is the approximate area under cultivation?

   Rice, sugar cane, cocoanuts, bonga, betel-nut, coffee, corn, banana, mango, gabi, sweet potato, and beneseed.

   About 625 hectares under cultivation.
2. If there is any one crop grown to the exclusion of others, what is it, and what is the approximate area devoted to its cultivation?

   There is but one, which is rice or palay, which covers an area of about 500 hectares.
3. What is the annual yield per hectare in piculs, cavans, or kilograms of the more important crops, and what is the approximate area under cultivation in each?

   The only important crop of this locality is palay, which yields an annual average of 43 cavans per hectare. Area covered as stated in question No. 2.
4. What crops or agricultural products supply the principal source of income in your municipality?

   Palay only.
5. What crops are grown only for local use?

   Sugar cane, cocoanut, betel nut, bonga, corn, coffee, banana, mango, gabi, sweet potato and bene seed.
6. Are garden vegetables raised to any extent; and if so, what are they?

   Yes; the large American bean (sitao), batao, chick-pea, beans, and patani.
7. Are there any wild fruits or vegetables which, in your opinion, might be introduced into cultivation?

   I know of some which might be cultivated to advantage. The bacalao or alupac, which is almost the same as the lechia of China; wild bananas, called amucao and tundoc, the size of which (especially the tundoc) is greater than that of the different varieties known and sold in the markets; the fruit of the palac-palac, the seed of which yields a vegetable wax; and the fruit of the malahabi, the seed of which contains oil.
8. Are fertilizers used in preparing the land for growing crops?

   No; for aside from the fertility of the soil, the leaves, etc., remaining in the fields after the cutting of the palay serve the purpose of fertilizers; part of this rubbish is allowed to decompose and part is burned.
9. Is stock raising engaged in by you or by the farmers of your municipality? If so, does it form an important industry? What animals are raised, and are they subject to diseases? If so, what are the diseases?

   They raise chickens, ducks, hogs, sheep, and goats, which would form one of the most important and profitable industries of the town if more attention were given to it. Of the animals raised only the following are subject to epidemics: Chickens and ducks to cholera, and hogs to cisti-cercus or trichinosis.
10. In your opinion, what animals might be introduced with advantage?

    The American hog and the burro.
11. Are the grazing lands or pastures in your district adapted to stock raising?

    Yes.
12. Do you raise any grasses, grains, or forage plants for feeding horses or cattle?

    Yes, on a small scale.
13. Do you deem the introduction of such grasses or forage plants desirable or important?

    Such introduction might be desirable, though not necessary, at least for the present.
14. Are any of the fruits, field or garden crops grown in your district injured by insects or disease?

    At present palay suffers from two ills, viz, the locust and the worm.

Please give below the names and addresses of farmers or planters whom you know to be interested in the improvement of the agricultural conditions of the islands either by adopting improved methods of handling the crops or by the introduction into cultivation of new and improved varieties of plants.

Potenciano Lesaca, Antonio Venzon, Roque Trinidad, Nicasio Acayan, Antonio Trinidad y Fierro, Macario Apostol, Sebastian Mercado, Francisco de la Rosa. These gentlemen reside in Iba, Zambales, P. I.

REMARKS.

The late epidemic of epizooty or rinderpest carried off 26,596 carabaos in this province, according to official records. These very important—indeed, the most important—factors in the pursuit of agriculture having been thus ruthlessly destroyed, has brought about a most lamentable condition, since, in spite of the greatest efforts on the part of the farmers, they are unable to till more than half of their lands with the few animals remaining to them. I believe some years will elapse before this province will have recovered from this great loss. Meanwhile the farmers of Zambales would be extremely grateful if the insular bureau of agriculture could indicate to them what machinery they might employ to do the work and thus help them to tide over this present crisis.

José Crisóstomo.

Iba, Zambales, *July 16, 1902.*

The Insular Bureau of Agriculture,
F. Lamson-Scribner, Chief,
Manila, P. I., August, 1902.

Sir: Among the many important plant resources of the Philippines the most valuable at the present time is manila hemp or abacá, a fiber produced nowhere else in the world in commercial quantities. The value of the hemp exported from the islands during the twelve months ending June 30, 1901, was $14,453,110, and the amount exported from Manila alone for the two years ending June 30, 1902, was nearly 100,000 tons, valued at over $13,000,000. There is a constantly increasing demand for manila hemp, and the world's supply of this fiber is practically limited to these islands. An industry of such paramount importance should receive careful consideration at the hands of the government, and every possible effort should be made to encourage abacá culture and to enlarge the productive area.

There are other fiber plants in the Philippines of more or less importance used in making cloth, hats, or other articles of utility, and in the wealth of vegetation abounding in these islands doubtless there will be discovered many plants yielding fibers possessing valuable qualities which will render them of commercial importance.

The insular bureau of agriculture has undertaken the study and investigation of the fiber plants of the Philippine Islands. The work outlined will include the determination of the kinds and qualities of the fibers produced and the plants producing them, the improvement of the fiber plants already grown, as well as the introduction of such other fiber plants as are likely to succeed and become profitable here, the search for new fiber-producing species, the study of the methods of extracting fiber and preparing the same for market, the investigation of market conditions, and the possibility of making finished products for export, and, in fact, generally promoting the fiber interests of this archipelago.

We respectfully invite your attention to these investigations, feeling assured that you can greatly aid the bureau of agriculture in making its work successful by giving us information relative to fiber plants and the fiber industries in your locality.

In order to lay this matter before you, we beg to submit a number of questions relating to the subject of fiber plants, with the request that you will kindly send us at your convenience a reply to those which may come within your knowledge. Any information you furnish will be highly appreciated by the chief of the bureau of agriculture, and full credit for such information will be given in publications which may result from these investigations.

A return franked envelope is inclosed for transmitting your reply.

Respectfully,

F. Lamson-Scribner,
Chief of Bureau.

Insular bureau of agriculture—Circular No. 3—Inquiries relative to fiber plants and fibers.

1. Name in the order of their importance all the plants of your province or municipality which yield fiber for commercial or local use.

   I will indicate, according to their importance, those plants which produce fiber, according to the best of my knowledge, in this municipality and province.

2. What is the approximate area occupied by these fiber plants and what is the estimated value of the fiber produced?

   It was not the custom here, even in the days of our forefathers, to plant fibrous vegetables other than that called piña; consequently I am unable to state the approximate area covered by these plants, nor their value, except in the case of the said piña. As far as I know, there is no other variety grown in the other municipalities of this province. But I do know that there are two other native varieties which are locally known as pasao and magué. Pasao is found among the sugar cane which is sown in January and March and grows on a par with sugar cane, on a small scale, to a height of 12 feet approximately. The laborers cut the plants close to the ground in October and November; they are then left in bundles in fresh water of rivers and creeks. After a week has elapsed the fiber is separated from the stalk and converted into rope, which is used as harness for plows and carts and for other local uses, but not for commerce. The fiber is extracted from the magué by means of a piece of sugar cane split in the middle, in which are placed three or four parts of the leaves, 1 vara in length, in order to remove the bark and separate the fiber, from which is made twine used for flying kites, a diversion indulged in by the young people at the close of the year until January. The people here are not inclined to make an industry of the pasao and the magué but only of the piña, whose shoots are sown in rows at a distance of 2 meters. When sown to cover an area of from 3 or 4 balitas to 1 quiñon, the proprietor does not replace them until they are in flower bud. The fiber is woven and the texture used for making shirts. This, however, is not so much desired by the owner as is the fruit which is gathered toward the end of May until June, and carried to market in bancas.

3. What is the amount of fiber produced by a single or individual plant, and what is the yield of fiber on any given area?

The preceding reply, in reference to piña fiber, also applies to this question.

4. Do you think that such fiber plants as cotton, flax, jute, ramie, or other commercial fibers not now grown in your vicinity might be successfully introduced and cultivated?

I believe that there might be introduced and cultivated in this district such plants as cotton, flax, jute, and ramie; but there exists an obstacle to this, which is that it is not the custom of the people here to vary their ancient practice of sowing palay, sugar cane, piña, bananas, and other trees, such as santol and mangoes, which are of greater importance to them than these other plants. I understand, therefore, that the above-named plants could not be cultivated with advantage, which is proved by the fact that the pasao planted by the inhabitants does not equal the abacá of Albay either in quality, strength, or life; the twine made from it does not stand water. Mr. José Zeced, mayor of this province in 1872, instructed that pasao be planted in suitable soil, but his mandate was not obeyed; it had been received, but was forgotten in time, and shortly after this Mr. Zeced was relieved from office.

5. Do you know of any native fiber plants not now used which might possibly be of some value?

I know of no others aside from those mentioned in the preceding reply, or in reply to question No. 2.

6. Give the names of those plants, the leaves, bark, or other parts of which are used for making hats, mats, or other articles of value. (Mention the part used).

The names of the plants from which hats are made are balioag, petacas, salacot, and petate, the first three being varieties of bamboo; also, even though unripe, uvay and ñigitó, which are fabricated in the towns of Balioag and Pulilan, and the salacot (for the laborers) in the town of Santa Isabel. Regarding the petate, this is used with the leaves of the buri (palm) and fabricated in the town of Calumpit in this province and in Apalit, Pampanga Province, which are adjacent towns. All of these fibers are used.

7. Do any varieties of rattan, or plants used for similar purposes, grow in your vicinity? If so, mention the degrees of abundance, and the names and uses of the different kinds.

Ovay is not grown in this district; it is a plant differing slightly from rattan, buri, or palm; only the bamboos grow in abundance, which, when seasoned, make good materials for bamboo and nipa houses.

8. If fibers or grades of fibers are produced in your district, which have distinctive names, please mention them along with the names of the plants from which they were taken.

There are no other species of fiber in this municipality which have other names, except those mentioned in my reply to question No. 2.

9. Please give the names and addresses of fiber-plant growers and those otherwise interested in fiber plants and their products.

This question is answered, in effect, by my reply to question No. 2.

Note.—All information relative to the soil and cultivation of fiber plants, the possibility of manufacturing paper from the native material, and, in fact, any notes relative to the fiber industry of the archipelago, are greatly desired and will be duly appreciated when furnished.

Further in regard to the above-mentioned pasao, I would say that Mr. José Zeced had given instructions that pasao be planted, with the object of agitating the market in regard to this fiber, for, in his opinion, and according to information then received, it was almost if not quite equal to the abacá of Albay. In my humble opinion, this order would now be effective, for in the soils in which sugar cane is planted there are also sown the seeds of pasao; not only that, but suitable land is devoted exclusively to it, there being an abundance of such land suited to this purpose in the towns of Quingua, Calumpit, Pulilan, Balioag, Bustos, Santa Isabel, and Guiguinto, in this province, as well as in the towns of the provinces of Pampanga, Tarlac, and Nueva Écija, and those in other provinces which I have not yet reached.

Regarding the method of extracting the fiber of the pasao so as to obtain the largest quantity and assure the best condition and quality, a more thorough study of the subject is indispensable. As I have stated, it is placed in bundles under water for a week, after which the fiber is separated from the stalk. However, this method does not secure to the fiber that degree of perfection which would give it the preference over other varieties.

Regarding the piña, as stated above, the method of extracting the fiber is to take a piece of wood, adapted to the length and width of the leaf of the piña. The leaf is spread out and, with the edge of a plate, the outer covering is removed, thus separating the fiber. This is then made up into small bundles and taken to a fresh-water river or stream, where it is passed through a kind of comb until it is thoroughly bleached. No material can be found here for the manufacture of paper.

Pascual Catindig,
Bulacan, Bulacan Province, P. I.

APPENDIX P.

REPORT OF THE DIRECTOR OF THE PHILIPPINE WEATHER BUREAU FOR THE YEAR ENDING AUGUST 31, 1902.

PHILIPPINE WEATHER BUREAU,
Manila Observatory, September 15, 1902.

Hon. DEAN C. WORCESTER,
Secretary of the Interior.

SIR: In compliance with your request I have the honor to submit the following statement about the work done in this bureau from the time of my last report to August 31, 1902. The statement is mostly an abstract of a more exhaustive report prepared by Rev. Marcial Solá, secretary and librarian of the bureau, which I intend to publish as an introductory to the volume Report of Observations for the Calendar Year 1902. It embraces:

A. An account of the erection of new meteorological stations.
B. Instruments in the central observatory and branch stations.
C. Telegraphic service and work in the branch stations.
D. Earthquake records.
E. Crop service.
F. Typhoon signals.
G. Publications of the bureau.
H. Work of the mechanics.
I. Work in the astronomical department.
J. Work in the magnetic department.

A. ERECTION OF STATIONS.

Two meteorological expeditions were sent—from July to September, 1901—to establish stations north and south of Manila, as per my last report. A third meteorological commission, composed of Father M. Saderra, assistant director, Father Marcial Solá, secretary of the bureau, and several observers, started from Manila on October 9 in the direction of Legaspi. The difficulty of finding in this town, the most important port in the province of Albay, a suitable spot for the erection of a station would have been almost insurmountable at the time had it not been for the generosity of the president, D. Balbino Belarmino, who offered part of his own house for the purpose. Here the instruments were deposited, without being mounted, for the time being, with the sole exception of the barometer, as advantage had to be taken of a favorable opportunity of going to the town of Atimonan, situated on the Pacific coast, in the province of Tayabas. While speaking of the installation of the meteorological station at Atimonan, we should not pass over the name of the military commandant, Capt. Charles Miller, who showed the liveliest interest in the meteorological service, and afforded us valuable assistance on various occasions. Observations were commenced with the apparatus on November 25, under the care of D. Pablo Garcia.

The station at Legaspi was set up on returning from Atimonan and regular observations began on December 9, with D. Bernardino Costa as observer.

I include a report of the assistant director, Father Miguel Sadarra Mata, who was commissioned to establish the stations of Tacloban, Iloilo, Zamboanga, and Capiz.

"In accordance with instructions received from the director of the bureau, I left Manila by the steamer *Sontua* on October 9 bound for Legaspi and Tacloban, at which points I was to establish stations, a first-class one in the former place and a second-class one in the latter. At 3 o'clock on the afternoon of the 12th I arrived at Legaspi in company with Father Marcial Solá, who, after setting up the apparatus at this place, was to pass over to Atimonan. I shall say nothing more of the Legaspi station, as Father Solá himself installed all the instruments after overcoming considerable difficulties which stood in the way.

"On the 19th I arrived at Tacloban, where I found the observer Balboa awaiting my arrival, and where I found no house yet prepared for the station. Although well received by the governor and the local authorities, whom I found gathered together at the time for a provincial consultation, they did not find it easy to afford me the effective aid that I desired in finding a suitable place for the station. Finally the municipal president offered a house which was under his management and which, although rather removed from the business center and the telegraph station, possessed other favorable conditions, such as proximity to the sea. At the very beginning the observer represented that the rent demanded, $15 Mexican, was a big drain on his income, still I concluded that the apparatus should be mounted, seeing that no better conditions could be obtained at the time. Through the kindness of the president I was enabled to obtain some carpenters, whom I hired immediately and with whose help the instruments were soon installed. A shelter for the thermometers was constructed and was placed in position outside the house, with a north exposure. The seismometer was fixed to an isolated beam in the interior of the instrument room.

"I left Tacloban on the 29th instant for Cebu, where I again took ship for Zamboanga with the intention of setting up the station at that point during the short delay of the steamer there. Fortunately I received all the assistance in their power in my work from General Davis and the military governor. They set apart for the station a large room in an angle of Fort Pilar, a neighboring inclosure for the open-air instruments, and gave permission to the observer to lodge on the military lands outside the barracks. They procured the carpenters needed and furnished all necessary passes. I was thus enabled to leave in less than a week's time with the satisfaction of seeing all the apparatus properly installed before I left.

"As I would have been unable to go from Zamboanga to Iloilo without being obliged to spend many days uselessly in the former town, I returned directly to Manila, whence I started once more on November 23, bound for the Visayan capital. I arrived at Iloilo on the morning of the 25th and was almost immediately convinced that it was practically impossible to establish the station without incurring unreasonable expense, owing to the difficulty of finding a suitable site. Accordingly, on the 26th, I sent a short note to the director of the bureau advising him of the condition of affairs and asking a reply by telegraph, so as to avoid any unnecessary delay in the installation of the station. Unfortunately my note did not reach its destination until the 28th or 29th. Hence, without waiting for the reply, I proceeded to mount the apparatus in a house selected by the chief observer, though the monthly rent amounted to $70 Mexican. This step was unavoidable, as I considered the erection of the station necessary, and according to the report of the governor and other parties in the town it was impossible at the time to find any other suitable situation. Of course, I did not believe it possible for the observer to stand the expense of such rent, but I trusted that the proper authorities, when the situation was laid before them on my return to Manila, would see the necessity of the step taken. Thanks to the energy of the chief observer of Iloilo, the instruments and their appurtenances were all mounted without delay, so that by the 2d of December I was able to embark for Capiz to inspect the station there.

"Reaching Capiz on the 4th, after a rather dangerous voyage, I saw that though the instruments had been well taken care of they had been installed in a very poor place, and I immediately set about having them removed to better quarters. Both the civil governor and the military commander afforded me all the assistance in their power, notwithstanding which, in view of the difficulties of board and rent, which would have to be borne by the observer, I resolved to leave things as they were until I could refer the case to Manila. I came the more easily to this conclusion since on my arrival at Capiz I received the answer to my Iloilo note, which contained a refusal to make any changes in previous arrangements. As I now had nothing further to detain me I returned to Manila to make my report of what had been done up to date."

The rent of the house in Iloilo used for the station has fallen rather heavily on the observatory. The house was obtained as a favor from a friend at a price much below that at which any other house of the same character could have been rented. Houses suitable for our purpose are very scarce in Iloilo at present, since the majority of them were destroyed during the recent war. The law which enjoined that the governors or municipal authorities should provide a suitable house and office for the observers was not passed until April, 1902. Hence, from the time that the observer took possession of the house, September, 1901, until March of the present year, the house rent amounted to $420 Mexican. As the cost of living in Iloilo was very high it was scarcely just that the observer should be obliged to pay nearly the whole of his salary for the rent of a suitable house for a station. Hence the observatory was obliged to advance this sum to the friend, being assured that when the case should be referred to the government the deficiency would be made up. I therefore respectfully propose that authorization be made that the said sum be taken from the contingent expenses of the present fiscal year.

I should also give an account of the expedition of Father Saderra Masó to Mindanao and the Visayas. This expedition was undertaken with the double object of inspecting and completing the work of installation of the first and second class meteorological stations of the district, and of determining, if possible, the magnetical elements of the declination, inclination, and horizontal component at these points. The following is a résumé of the report made by the said father:

"On the 4th of May I embarked at the river in Manila in company with the first-class observers D. C. Duleña, who came as my assistant, and D. A. Zamora, lately appointed observer at Bacolod, Negros. Owing to the quarantine regulations we were unable to leave Manila Bay until the night of the 13th. The first station visited was the first-class station of Iloilo. I found it in good working order, the observations having been taken with regularity and care. I changed the mercurial barometer and tested the other instruments. As the observer was then unwell it was determined that Mr. Zamora should remain there to assist him until he had recovered, after which he was to set out for Bacolod to erect the second-class station at that place. My assistant determined the declination, inclination, and horizontal component while I looked after the business of the rent of the building with the governor and the owner of the house. I remained only forty-eight hours at Iloilo, embarking immediately for Zamboanga, where I arrived on the 21st.

"The first-class station at this city needed an inspection very badly, as the chief observer seems to have been rather negligent. The observations had not been taken with the regularity or precision desired and the self-registering instruments had not been properly looked after. I tested all the instruments, adjusted some, and changed the position of others that had been poorly mounted. In the meantime my assistant made various absolute magnetical observations, and in addition mounted a variation declinometer in order to investigate the variation of the diurnal declination. As the proper running of the station for the future required my actual presence for some days yet, on May 30 I commissioned my assistant, Mr. Duleña, to set out for Cottabato and Jolo, with the object of determining the magnetical elements at those points and of setting up the third-class stations under Mr. A. Enrile and Mr. T. Aquino, all of which was carried out to my perfect satisfaction. During my sojourn in Zamboanga I also gave instruction to a young man from Isabela de Basilan so that he might be able to take charge of a fourth-class station at that point.

"The Zamboanga station is located in a fine position offered by the military government, being situated in an angle of the fort looking south. The tower in which the instruments are installed touches the shore and is elevated some 7 meters above sealevel. The situation is doubtless the most desirable in Zamboanga, right on the sea shore with a clear horizon in every quadrant, and free from the inconveniences which would have to be put up with in the houses in the city. There is a large and well-ventilated room for the self-registering instruments and for the office, while the shelter for the instruments for the open air is on the top of the southern tower.

"On June 9 I left Zamboanga for Davao. In passing through the military encampments of Malabang and Macar the magnetical elements were determined. From Macar I took the accompanying view of the beautiful extinct volcano Matutun (see fig. 1), which lies about 17 miles north-northwest of the encampment. I reached Davao on June 15. The third-class station at this town was found in good order, the instruments mounted in a room of the convent which had been offered for the purpose by the Jesuit parish priest; however, I found it convenient to transfer the instruments to another part of the town where there was more room available. Hence, I mounted them in the house of the observer himself, near the river, at the extreme west end of the town. This position, like the rest of the town, has not a clear horizon on account of the neighboring forests that surround the spot, and, moreover, it is too far from the sea. I am of the opinion that a spot farther east should be sought where there is no forest growth to cut off the sea view. In Davao also the magnetical elements were determined and a view was taken of the great active volcano Apo. (See fig. 2.) I set out by the first steamer for Matti and Caraga.

"By June 23 I was already in Matti, but seeing that it would be impossible to get to Caraga I determined the magnetical elements at Matti, and determined to turn back toward Zamboanga and thence to Cebu, where I finally arrived June 30.

"The chief observer at Cebu is deserving of congratulation for the accuracy and diligence with which he had carried out what had been intrusted to him. All that remained for me to do was to give some instructions in regard to the adjustment of the seismometer.

"From Cebu I passed over to Surigao to inspect the second-class station established there. Besides adjusting some of the instruments and mounting an anemometer and seismometer, we made two determinations of the magnetical elements and studied the diurnal variation of the declination.

"On the 12th of June I set out for Butuan to inspect the second-class station that had been established there toward the end of May of the present year. I am sorry to be obliged to give an unsatisfactory report of the observer, Mr. Morales. Although two months had elapsed since all the apparatus destined for the station had arrived, and notwithstanding the fact that the parish priest of the town, one of the Jesuit Fathers, had offered him a very suitable place in the convent for mounting his apparatus, I found on my arrival that not a single instrument had been put in proper running order. Only the barograph and psychrometer had been mounted, and these very poorly. The other instruments lay piled up confusedly in a corner of the room. Of course none of the observations had yet been taken with regularity at the hours appointed. On some days the aneroid barometer had been read, but the reductions to sea level were full of mistakes. I was, therefore, occupied from my very arrival in mounting the instruments still unmounted, and in adjusting those that had been badly mounted, and I then urged the observer to commence to fulfill the obligations that he had undertaken. I saw from the beginning that he unfortunately took very little interest in the matter, since I saw with my own eyes that very often he failed to appear at all at the hours when the observations should have been taken. In view of the above, and from what I have learned of his conduct after my departure, it is my opinion, and as such I would propose, that Mr. Morales be relieved of his charge as soon as possible. The station of Butuan is of great importance in the study of the climatology of the extended valley of the Agusan River, which valley undoubtedly has a great agricultural future. The magnetical elements were also determined at Butuan on two distinct days. The same was done at the port of Nasipit and at Cabarbaran, situated west and east, respectively, of the bay of Butuan.

"As it was now necessary for me to return to Manila, I embarked at Surigao on July 26. As the steamer made a long stop at Mambajao, Camiguin Island, we had leisure to take the magnetic elements, and, in addition, I was able to gather some interesting data concerning the volcanoes of this island, especially regarding the solfataras that appeared toward the end of 1897 on the crest of Mount Agojo, which had been extinct since before the conquest. There are other new solfataras that had, by a strange coincidence, made their appearance on the night previous to my arrival. The accompanying outline drawing represents the actual state of the volcanoes of Camiguin, and the eruption of 1871 (see figs. 3 and 4). The historical notes and the other details which I collected concerning this volcano may be found in a short report printed in the monthly bulletin for July.

"The results obtained from the determinations of the magnetical elements during my trip through Mindanao may be seen under the head 'Work in the magnetic department.'"

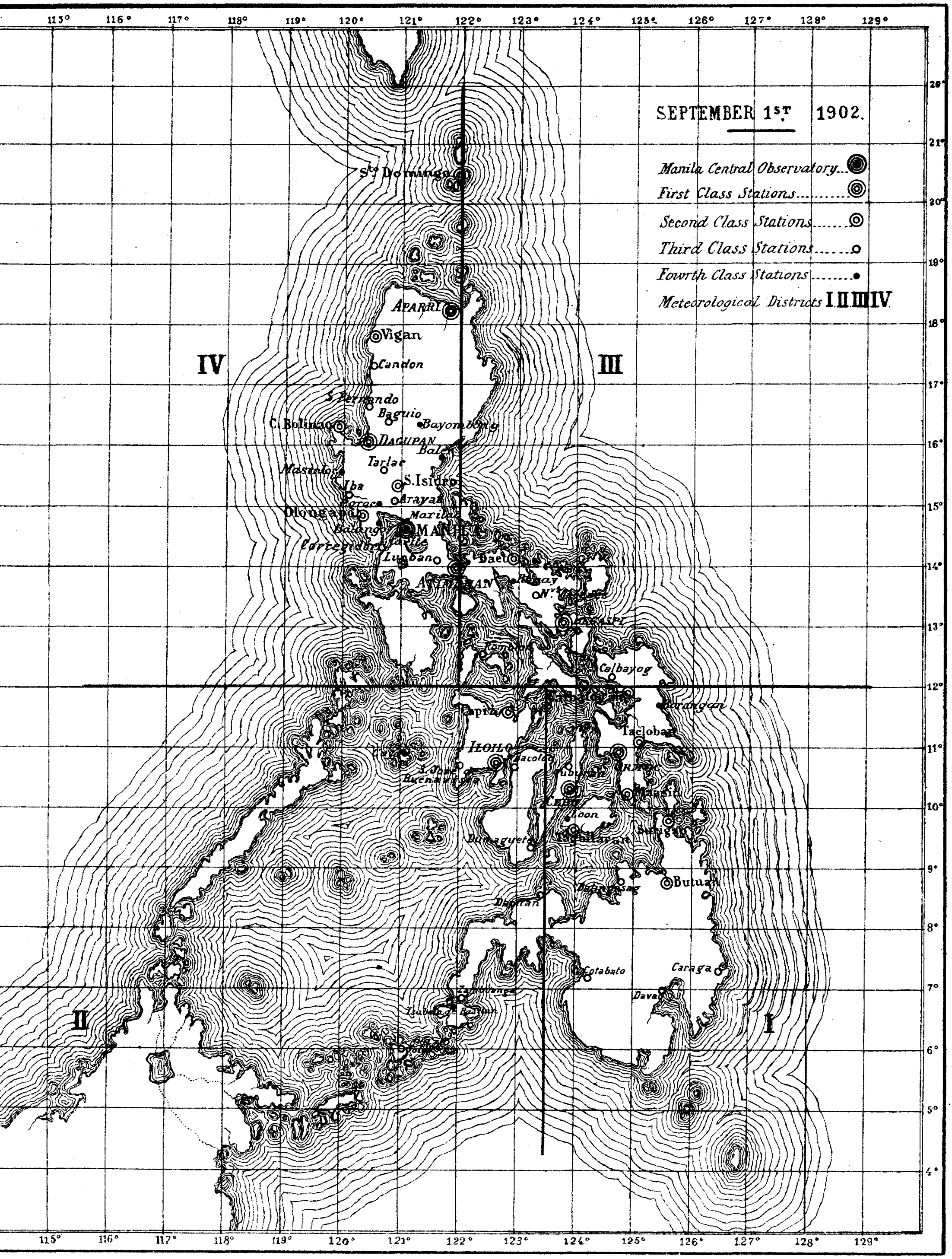
Summing up what we have said concerning the establishment of the stations, we may say that by the end of the calendar year 1901, 14 stations had been established and put in regular running order, and about the end of August, 1902, the following stations were erected, which I have noted on the inclosed, map "A:"

Station.	Province.	Geographical coordinates.				Class.	Telegraphic reports every day to the Manila central.
		Latitude north.		Longitude east.			
		°	′	°	′		
Aparri	Cagayán, Luzón	18	21	121	35	First	6 a. m., 10 a. m., 2 p. m.
Dagupan	Pangasinán, Luzón	16	4	120	16	do	Do.
Antimonan	Tayabas, Luzón	13	59	121	53	do	Do.
Legaspi	Albay, Luzón	13	9	123	44	do	Do.
Oromoc	Leyte	11	1	124	33	do	Do.
Iloílo	Iloílo, Panay	10	42	122	34	do	Do.
Cebú	Cebú	10	17	123	35	do	Do.
Santo Domingo	Batanes	20	25	121	58	Second	
Vigan	Ilocos Sur, Luzón	17	33	120	24	do	Do.
Cabo Bolinao	Zambales, Luzón	16	24	119	55	do	Do.
San Isidro	Nueva Ecija, Luzón	15	18	120	52	do	Do.
Olongapó	Zambales, Luzón	14	50	120	16	do	Do.
Daet	Camarines, Luzón	14	5	122	57	do	
Cápiz	Cápiz, Panay	11	34	122	45	do	Do.
Tacloban	Leyte	11	15	124	59	do	Do.
Bacolod	Negros Occidental	10	40	122	56	do	Do.
Maasin	Leyte	10	8	124	45	do	Do.

PHILIPPINE WEATHER BUREAU

METEOROLOGICAL DISTRICTS AND STATIONS

A



ANDREW B GRAHAM. PHOTO-LITHO. WASHINGTON. D.C

Station.	Province.	Geographical coordinates.				Class.	Telegraphic reports every day to the Manila central.
		Latitude north.		Longitude east.			
		°	′	°	′		
Surigao	Surigao, Mindanao	9	45	125	31	First	6 a. m., 10 a. m., 2 p. m.
Tagbilaran	Bohol	9	38	123	50	do	Do.
Candón	Ilocos Sur, Luzón	17	22	120	27	Third	6 a. m., 2 p. m.
San Fernando	Union, Luzón	16	37	120	21	do	Do.
Baguío	Benguet, Luzón	16	35	120	43	do	Do.
Tárlac	Tárlac, Luzón	15	31	120	35	do	Do.
Iba	Zambales, Luzón	15	21	119	57	do	Do.
Arayat	Pampanga, Luzón	15	8	120	46	do	Do.
Corregidor	Isla Corregidor	14	24	120	38	do	Do.
Lucbán	Tayabas, Luzón	14	5	121	33	do	Do.
Nueva Cáceres	Camarines, Luzón	13	38	123	12	do	Do.
Calbáyog	Sámar	12	7	124	40	do	Do.
Catbalogan	do	11	46	124	53	do	Do.
Tuburan	Cebu	10	48	123	48		
San Jose de Buenavista.	Antique, Panay	10	44	121	54	Third	Do.
Dumaguete	Negros Oriental	9	21	123	17	do	Do.
Balingasag	Misamis, Mindanao	8	48	124	46		
Butuan	Surigao, Mindanao	8	46	125	35		
Dapitan	Misamis, Mindanao	8	38	123	24	Third	Do.
Caraga	Surigao, Mindanao	7	30	126	32	do	Do.
Cottabato	Cottabato, Mindanao	7	13	124	12	do	Do.
Dávao	Dávao, Mindanao	6	58	125	35		
Zamboanga	Zamboanga, Mindanao	6	55	122	2	Third	Do.
Joló	Isla de Joló	6	3	120	59	do	Do.
Bayombong	Nueva Vizcaya, Luzón	16	28	121	6	Fourth	Occasionally.
Masinloc	Zambales, Luzón	15	34	119	56	do	Do.
Marilao	Bulacán, Luzón	14	46	120	56	do	Do.
Balanga	Bataan, Luzón	14	42	120	32	do	Do.
Cavite	Cavite, Luzón	14	29	120	54	do	Do.
Borongan	Samar	11	42	125	25	do	
Cuyo	Paragua	10	51	121	1	do	
Loon	Bohol	9	48	123	47	do	Do.
Isabela	Basilan	6	40	121	57	do	Do.

These stations cover a very large area, especially in latitude from 6° 3′ to 20° 25′ north. Owing to this circumstance there is no tropical storm moving in the Far East without being noticed and felt somewhere in the archipelago.

Santo Domingo de Basco station (Batanes Islands) will be in working order about October next.

Baler, Bayombong, and Catbalogan are served by voluntary observers with instruments furnished by the bureau.

(B) *Instruments in the central station at the Manila Observatory.*—Instruments in work at the Manila Observatory are enumerated in the report of the first United States Commission in the Philippines, volume 4, pages 117–124. I will confine myself here to giving an account of the most important instruments set up during the period of this report.

Vicentini's universal microseismograph.—I was much pleased with the work and results of this very new instrument during my visit to the Geodinamic Observatories of Italy in the summer of 1900, and while at Pavía I conferred with Professor Vicentini about the construction of his improved instrument for the Manila Observatory. Professor Vicentini offered to have the instrument made by his mechanics and inspected by himself. Fully half a year was expended in the construction of the instrument, which experience has proved to be excellent. The instrument was set up ready for work in April, 1902, and the results since then have been regularly published in our monthly weather bulletin. The first test of the efficiency of the instrument was the record of the Guatemala and Mexico earthquake of April 18. There will be no shock of importance in any part of the earth not likely to be registered on our instrument. A full description of this microseismograph will be found in the Report of Observations for the Calendar Year 1902.

Ceraunograph.—This is another new and very promising instrument. Since the discovery of the existence of electro-magnetic radiation emanating from disruptive discharges of electricity whose velocity in space has proved to be that of light and whose waves follow the same laws of interference, reflection, refraction, and other phenomena of light, Lodge and Marconi have developed the "coherer," an instrument devised to detect the passage of electric magnetic waves. The efforts of some master minds were soon directed to turn this new force and the "coherer" to some practical use. The first result was its successful application to telegraphy without wire by Marconi. The fact that disruptive discharges like lightning send out these electric ether waves naturally led meteorologists to consider this new force and instrument in connection with electric storms. Their efforts have met with success, which leads us to expect that electro-magnetic waves and the "coherer" will become in time a very valuable adjunct to every meteorological and life-saving station, especially in countries which the dreadful tornado is likely to ravage. The first attempt made in the Philippines of a practical application of the electro-magnetic waves has been carried out with the most encouraging results, and it is now a fact that in the observatory lightning is harnessed just as the wind, temperature, sunshine, and pressure have been harnessed and forced to record their own doings. The instrument has been used in the meteorological service since August 24 last. It was constructed in Kalocsa, Austro-Hungary, under the supervision of Rev. Father Fenyi, S. J., director of the Kalocsa Observatory, and belongs to the type of a similar instrument devised by Rev. Father P. J. Schreiber, S. J., of the Kalocsa Observatory. The various parts of the instrument, all told, are a coherer, an alarm bell, a coil with one magnetic needle, two batteries, and a recording disk. The copper collector consists of a copper horizontal insulated wire uniting the towers of the observatory. The coherer consists simply of two steel wires adhering to each other in the form of a cross. The coherer and the coil with its magnetic needle are worked by a battery of Meidinger type (one element) with proportionate resistance. The coherer is also connected with the collector and with the earth through a lightning wire. Four Lechanché elements work the alarm bell whenever the electro-magnetic waves are received on the collector and the coherer becomes a good electric conductor and then the magnetic needle is worked by the coil and closes the Lechanché current, moving the electro-magnet, which registers on the disk. The vibration of the coherer through the movements of the alarm bell restores the coherer to its first condition of nonconductor, ready to be acted upon by a new electro-magnetic wave. On the disk more than 300 flashes of lightning have been registered in Manila from 10 a. m. to 9 p. m. on the 24th. The distance from which the flash through its electro-magnetic waves may affect the coherer has not yet been calculated, but it is supposed to be no less than some 20 miles. Experiments to increase the sensitiveness of the coherer are being made, and it is expected that very soon we will be able to register a flash of lightning some 150 or 200 miles distant.

The name adopted for the new instrument is "ceraunograph," from the Greek name for lightning, after the name given by R. F. L. Obenbach, S. J., director of the observatory at Cleveland, Ohio, the only place in the United States where similar experiments are conducted.

Apparatus at the various stations.—The majority of the instruments are the same as those in use in the United States, and were generously offered and supplied under order of the Chief of the Weather Bureau, Mr. W. L. Moore, who, we must acknowledge, has always shown the greatest interest in the reestablishment of the Philippine weather service. In a letter to Father Algué, dated April 5, 1901, he says:

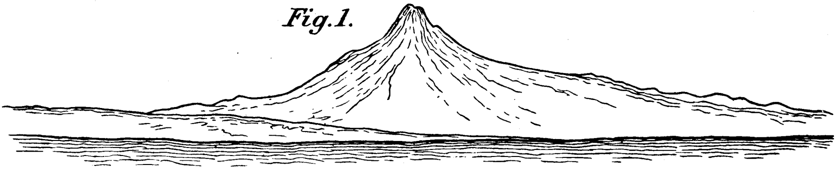
"I assure you that you shall have our cheerful cooperation and our hearty good will in everything that we can do to further the interests of the meteorological service of the Philippines as administered under your able direction. Please make use of us for the purchase and shipment of any additional apparatus or materials that you may need from this country."

We feel that we owe sincere thanks to Prof. W. L. Moore.

The catalogue of the apparatus with which the stations of the new meteorological service are supplied may be found in the Report of the United States Philippine Commission for the period from December 1, 1900, to October 15, 1901, Appendix 4, report of the Director of the Philippine weather bureau.

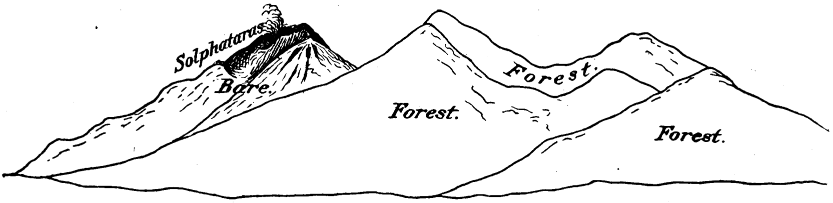
The typhoon barometer.—The form of this mercurial barometer which has been adopted in the third and fourth class stations is very simple. At each side of the vernier two small plates are placed, one of them fixed, the other movable. With this modification I succeeded in applying to the mercurial barometer the advantages possessed by the movable disk of the barocyclonometer, since the movable plate carries engraved on its surface the notes, conveniently spaced, relative to typhoons. This plate then, moving in two grooves on either side, can be raised or lowered at will by a slight movement of the screws by which it is attached to the support. This adjustment is made in order to bring the little red arrow marking the dividing line of the typhoons exactly opposite that division on the fixed plate which the latitude of the place and the season of the year at which the observation is made may demand. What barometric reading denotes the typhoon limit in different latitudes of the extreme east in the different months of the year may be seen in the following table, for the right understanding of which it may be well to remark that in the first group are included the months of December, January, February, and

Fig. 1.



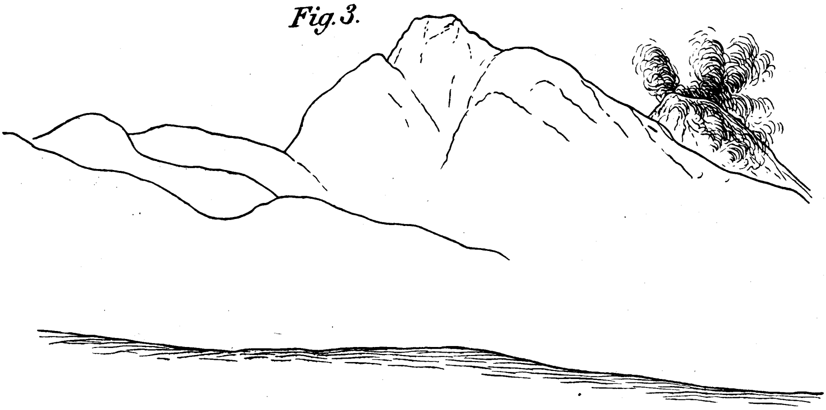
Matutun Volcano, looking S.

Fig. 2.



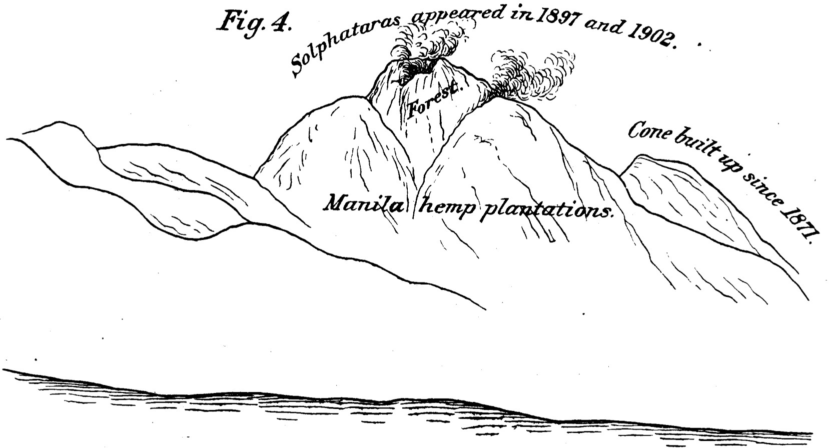
Apo Volcano, looking E.

Fig. 3.



Catarman Volcano, looking N.N.E.
1871.

Fig. 4.


Solphataras appeared in 1897 and 1902.
Forest.
Manila hemp plantations.
Cone built up since 1871.

Catarman Volcano, looking N.N.E.
1902.

March; in the second, April, May, October, and November, and in the third, June, July, August, and September.

Between parallels—	Mm.	Inches.	During the months of—
0°-11° N	756	29.76	All through the year.
11°-17° N	756	29.76	First group.
	755	29.73	Second and third group.
17°-21° N	757	29.80	First group.
	756	29.76	Second group.
	755	29.73	Third group.
21°-25° N	760	29.92	First group.
	757	29.80	Second group.
	753	29.65	Third group.
25°-32° N	765	30.12	First group.
	762	30.00	October and November.
	758	29.84	April and May.
	753	29.65	Third group.
32°-35° N	763	30.04	First group.
	758	29.84	Second group.
	754	29.69	Third group.
35°-40° N	761	29.96	First group.
	757	29.80	Second group.
	754	29.69	Third group.
40°-50° N	756	29.76	All through the year.

This table, owing to its importance, accompanies the barometer, together with some short instructions.

We may note, moreover, that the tube of this barometer, being a siphon which may be raised or lowered without difficulty, facilitates the correction of the height, if such correction be needed.

The typhoon barometer, by the introduction of the modification which we have just spoken of, is practically of the same importance as that of the aneroid forms, since from it may be obtained the same information as may be obtained from the aneroid. It has the additional advantage over the aneroid that its indications can be relied upon in all weather, since the mercurial column is not subject to the oxidation of the metals of these barometers, and moreover it obeys more readily the atmospheric pressure than do the levers of the aneroid. The aneroid, on the other hand, is more easily managed and more portable, and on this account more commonly used among ordinary people, but it is certainly not preferable to the mercurial barometer, at least when intended for use on land. The drawing of the instrument may be seen in the second part of the report of the director of the Philippine weather bureau.

Description of shelters.—At the stations of the archipelago there are, as we have already indicated in the list of apparatus, two forms or types of shelters for the thermometers. The first-class stations are provided with one in the shape of a hollow wooden cube, with simple Persian blinds for sides, and are elevated above the ground some 3 meters. It is the model used in the United States. For all the other stations of the Philippines we have adopted another type, more simple, much less costly, and more suitable for the tropical conditions in the islands. It has a square or rectangular base, according to the number of instruments it is destined to contain, and its disproportioned roof is greatly prolonged over the sides in all directions. Such a disposition is found to be very advantageous, as the archipelago is within the Tropics, the southern part being only some five degrees from the equator, and the sun during the course of the year travels from one side to the other of the zenith in all the towns of the islands. The shelter is double; the outer cover is made of thatched nipa palm, a material which, as experience shows, is a good nonconductor of heat and allows the air to pass through the interstices freely. The inner shelter is of wooden latticework, while a moderate air space is allowed between the two shelters. We have said that the roof is prolonged disproportionately, and the advantage of this is that, preventing as it does the rays of the sun, the lateral walls are left open from their upper edge halfway down, while the inferior half is closed with bamboo blinds. The base of the shelter is also partly open. By this system of shelter we obtain perfect ventilation and the free circulation of the air from all sides, making sure in this way that the conditions on the inside of the shelter are really those of the shade in the open air. This shelter, though it may be set up on the ground on four feet, is, since it is very light, commonly suspended from a post. To facilitate its attachment to such support the box is provided with two suitable grooves in its posterior aspect. It should be placed at a convenient height for the observer, that he may be able to open the little door easily when he makes his observations. Descriptive drawings of this form of shelter are to be found in the published report already mentioned.

A new seismographic pendulum.—In the new service all the stations of the archipelago are at the same time seismical and meteorological, all of them being supplied with seismographic apparatus, by the aid of which we are able to analyze much better the earthquakes that occur so frequently throughout more or less the whole of the archipelago.

In order to obtain some understanding of the seismic system of the islands, it was determined that perfectly similar seismographic pendulums should be used at all the stations, so that the curves obtained from any single earthquake at the various points of observation could be compared without the inconvenience which usually results when the apparatus used at different stations is not of the same size and pattern. Moreover, it was procured that this pendulum for use at all the stations should possess such a degree of sensibility that it should register only such movements of the earth as are perceptible by persons in a state of rest. We have not hereby excluded more perfect instruments; on the contrary, it is intended to set up some much more perfect instruments at certain important points of greater seismic activity, where apparatus of this nature may be installed with more profit.

The seismographic pendulum adopted for the whole archipelago is very simple and hardly requires any explanation of its parts, though a word may be said of the method of suspension made use of, which is altogether original. It is hung by a flat spiral spring, the upper extremity of which is fixed to a firm support by means of a bolt and the lower end to a small, hollow metallic cone with a well polished interior surface. The cone rests on a fine point and sustains the weight of the pendulum by means of a ring to which the rod and weight of the pendulum are fixed. A more detailed description of this apparatus, with accompanying plates, may be seen in the report above mentioned.

The method of suspension just described has this advantage, the pendulum is free to move only in the plane in which it has received an impulse from the earth's movement, and if during the earthquake impulses come from different directions, these directions alone are traced by the pen, so that no gyratory movements can be recorded, unless the actual movement of the earth was such.

(C) TELEGRAPHIC SERVICE.

In the law approved by the Philippine Commission May 22, 1901, the observations and work to be performed at the various stations were determined only in a general way, so that, as the law itself expressly states, it is left to the discretion of the director to determine in detail the number and kind of observations and to specify what class of work is to be performed by the various observers. All these details were arranged and fixed in the shape of a pamphlet of brief instructions issued to all the observers, and printed on May 31, 1901.

Concerning the daily telegrams it was ordered that the heads of all first and second class stations should transmit telegraphically their observations three times a day. The hours appointed were 6 a. m., 10 a. m., and 2 p. m., mean time of the one hundred and twentieth meridian east of Greenwich. The observers at the third-class stations should send their observations twice a day, namely, at 6 a. m. and 2 p. m.

These telegrams were sent for a while in the following form, which is almost identical with that used under the old service:

March 10, 6 a. m.:
59.8 (barometer, corrected for temperature and reduced to sea level).
27.5 (temperature in shade).
NE. 5 (direction and force of wind).
8 (amount of clouds).
Ci. E. (cirrus from east).
A-Cu. NE. (alto-cumulus from northeast).
Cu. NNO. (cumulus from north-northwest).
0 p (weather cloudy with passing showers).
H (heavy seas).
25.2 (rainfall since last telegram).
Convergence of cirrus in the east.

Such was the form of the telegrams in use for awhile. Afterwards, in order to facilitate the transmission of the telegrams from so many different stations, a cipher form was adopted, which was first used about the end of the year 1901. By means of the cipher the above telegram becomes reduced to four sets of numerals. The first set expresses the day of the month and the hour of the day, the day beginning at midday and counting from thence twenty-four hours. The three remaining sets consist of five numerals each. An ordinary telegram, for instance, would appear as follows:

0620, 59827, 20216, 57756.

The first three numerals of the second group represent the height of the barometer and the last two the reading of the thermometer, the above example reading 59.8 millimeters, 27 degrees (Centigrade). In the third set the first three figures give the direction and force of the wind, according to keys (*a*) and (*b*). The fourth and fifth show the kind and direction of the higher clouds, in accordance with keys (*c*) and (*d*). In the fourth set the first two numerals tell the kind and the direction of the lower clouds, in accordance with keys (*c*) and (*d*). The third numeral shows the condition of the sky, the fourth the condition of the sea, and the fifth the rainfall, in accordance with keys (*e*), (*f*), and (*g*).

To the above sets the observer adds a fifth when he wishes to send word of any true convergence of the real cirrus clouds. The key to this set may be found in (*a*). For instance, to express convergence of cirrus in the southeast he would put 112.

When an earthquake has taken place it is expressed by an extra set of five numerals, as may be instanced in the following: 19354, in which the two first elements tell the hour, the two following the minute, as in keys (*h*) and (*m*), and the fifth the intensity, in accordance with key (*i*).

Wind.

(*a*) DIRECTION.

00=Calm.
02=NNE.
04=NE.
06=ENE.
08=E.
10=ESE.
12=SE.
14=SSE.
16=S.
18=SSW.
20=SW.
22=WSW.
24=W.
26=WNW.
28=NW.
30=NNW.
32=N.

(*b*) SCALE OF THE FORCE.

Terrestial.	Beaufort.	Meters per second.	English miles per hour.	
0	0	0.0- 1.3	0- 3	Calm.
1	1	1.3- 3.6	3- 8	Light, perceptible wind, which moves pennant or small flag.
	2	3.6- 5.8	8-13	Light breeze; stretches out a pennant and moves the leaves of trees.
2	3	5.8- 8.0	13-18	Moderate; moves the branches of the trees.
	4	8.0-10.3	18-23	
3	5	10.3-12.5	23-28	Moves the heavier branches and small trunks of trees.
	6	12.5-15.2	28-34	
4	7	15.2-17.9	34-40	Strong; moves the whole tree.
	8	17.9-21.5	40-48	
5	9	21.5-25.0	48-56	
	10	25.0-29.1	56-65	Hurricane.
6	11	29.1-33.5	65-75	
	12	33.5-40.3	75-90	

Clouds.

(*c*) FORM.

0=Without clouds.
Upper clouds:
  1=Ci.=Cirrus.
  2=Ci. S.=Cirro-stratus.
  3=Ci. Cu.=Cirro-cumulus.
  4=A. Cu.=Alto-cumulus.
Lower clouds:
  5=Cu.=Cumulus.
  6=S. Cu.=Strato-cumulus.
  7=Cu. N.=Cumulo-nimbus.
  8=N.=Nimbus.

(*d*) DIRECTION.

0=Without motion.
1=NE.
2=E.
3=SE.
4=S.
5=SW.
6=W.
7=NW.
8=N.

(*e*) WEATHER SYMBOLS.

0=b=Clear blue sky.
1=c=Cloudy weather.
2=d=Drizzling or light rain.
3=l=Lightning.
4=o=Overcast.
5=p=Passing showers of rain.
6=q=Squally weather.
7=r=Rainy weather, or continuous rain.
8=t=Thunder.
9=u=Ugly appearance, or threatening weather.

Clouds—Continued.

(*f*) SEA SYMBOLS.

1 = S = Smooth sea.
2 = L = Long rolling sea.
3 = T = Tide rips.
4 = M = Moderate sea or swell.
5 = H = Heavy sea.
6 = R = Rough sea.

(*g*) RAIN.

0=0 mm.
1=0-5 mm.
2= 5-10 mm.
3=10-15 mm.
4=15-25 mm.
5=25-35 mm.
6=35-50 mm.
7=50-70 mm.
8= 70-100 mm.
9=100-500 mm.

Earthquake symbols.

(*h*) HOURS.

00=Noon.
01=1 p.m.
02=2 p.m.
03=3 p.m.
04=4 p.m.
05=5 p.m.
06=6 p.m.
07=7 p.m.
08=8 p.m.
09=9 p.m.
10=10 p.m.
11=11 p.m.
12=12 mn.
13= 1 a.m.
14= 2 a.m.
15=3 a.m.
16=4 a.m.
17=5 a.m.
18=6 a.m.
19=7 a.m.
20= 8 a.m.
21= 9 a.m.
22=10 a.m.
23=11 a.m.

(*m*) MINUTES.

01=1.
02=2.
03=3.
04=4.
05=5.
06= 6.
07= 7.
08= 8.
09= 9.
10=10.
11=11.
12=12.
13=13.
14=14.
15=15.
16=16.
17=17.
18=18.
19=19.
20=20.
21=21.
22=22.
23=23.
60=60.

1. Perceptible (from 0° 0′ to 0° 10′): Movement perceptible to persons in repose who are accustomed to such phenomena and registered by various seismographs.
2. Light (from 0° 10′ to 1°): Earthquake felt by a man not in repose, accompanied by light movements and noise of lighter objects shaken, such as doors, windows, hanging pictures, etc.
3. Weak (from 1° to 4°): Sensible earthquake throughout the neighborhood, with movement of heavy objects, such as furniture, beds, etc.
4. Strong (from 4° to 10°): Movement capable of arousing those in sleep, notable shaking of lamps, stopping of clocks, ringing of large bells, falling of objects, etc.
5. Violent (from 10° to 18°): Violent shocks, which crack walls and solid houses, overturn heavy objects, and even human beings.
6. Destructive: Partial or complete destruction of houses, great disasters, crevices opened in the earth, etc.

Such is the form of the telegrams received at the central and other stations of the archipelago.

Work in branch stations.—In conformity with section 9 of the law already referred to, six observations a day, distributed in the following manner, 2, 6, and 10 a. m. and 2, 6, and 10 p. m., are taken at the second-class stations. The observations taken in this manner at equal intervals will allow their mean values to be deducted with considerable scientific accuracy. At the first-class stations the same number of observations is taken at the same hours, but in addition self-registering instruments keep a continuous record of the principal meteorological elements, as provided in section 8 of the same law.

At the third-class stations observations are taken only twice a day, namely, at 6 a. m. and 2 p. m., with the exception of such days as the director may judge convenient that observations should be taken more frequently.

At the rain stations, as is clearly specified in section 11, the daily maximum and minimum temperature is observed, barometrical observations are taken at 6 a. m. and 2 p. m., and a record is kept of the rainfall.

In order that the observations may be taken regularly at the hour appointed, and in order to regulate properly the self-registering instruments, the chief observer at each station compares his watch every day with that at the telegraph station where the exact time is transmitted daily from the central observatory at 11 a. m., as provided in section 14.

All the stations are supplied with printed blank forms which the observer fills in with the results of his observations, and which are sent to the central observatory at the end of the month for further discussion.

Monthly bulletin.—As prescribed in sections 8 and 9 of the aforementioned law, the heads of the first and second class stations must draw up a monthly bulletin, taking as a model the one which is published at the central observatory at Manila. Their bulletin contains the following material:

1. A page comprising all the general observations, similar to the first page of the bulletin of the central observatory.
2. In the first-class stations the hourly record of the barograph, thermograph, and anemograph, with the corresponding means made out for each of the twenty-four hours of the day, and, finally, the daily means deduced from twenty-four observations.

The heads of the second-class stations make out their tables of observations of barometer, thermometer, humidity, vapor tension, winds, and clouds in the same way as is done in the Manila table, though at Manila the results are deduced from twenty-four daily observations while in those stations only six are used. Similar to the second-class tables are those drawn up by the heads of the first-class stations, wherever the self-registering instruments are not yet installed.

3. Besides the data above referred to, the station bulletins from both first and second class stations give, finally, tables of the extreme values, the frequency of winds, rainfall, evaporation, storms, etc., such as are found on the last page of the bulletin published by the central observatory.

4. At the end of the year a synopsis is made similar to that found as an appendix to the annual volume of the bulletin.

Heads of third-class stations follow the prescriptions laid down in section 11, making out at the end of each month a table similar to that published by the observatory prior to May, 1898, including in it the two daily observations from the secondary stations of Luzon, and marking at the foot of the table the respective monthly means. These two daily observations are now made at 6 a. m. and 2 p. m.

(D) EARTHQUAKE RECORDS.

All the stations in the new service in the archipelago are also considered as seismic stations, as we have already said when speaking of the various apparatus. Hence in all of them a minute and exact record is taken of all earthquakes, no matter how small they may be, provided they are perceptible. Record is kept of the exact hour of the earthquake, the duration, character of the movements and the directions of same, and finally their intensity. These last three points can be easily deduced from the curves traced by the pendulums, excepting, however, the movements that are purely vertical. The hour and duration is also recorded automatically by means of a simple seismoscope. This latter consists essentially of a drum moved by clockwork and an electric circuit which is closed by the movement of the pendulum.

For expressing the intensity of the earthquake the same scale is used throughout the archipelago, namely, the scale already cited when speaking of the transmission of the telegraphic messages of observation. The scale of Rossi-Torel has been, for the sake of simplicity, reduced from 10 to 6 degrees.

Besides the above earthquake data, the observers are advised, in order that our material may be as complete as possible, to send a minute description not only of the effects of the earthquake, but also of the phenomena that usually accompany it, or that are supposed to have any relation to it, such as subterraneous noises, volcanic or electric displays, or terrestrial or atmospheric currents which usually affect cables and telegraph or telephone lines.

Heads of stations are obliged to transmit to the central observatory as soon as possible all of the above meteorological and seismical observations, and all the rest of the work, together with the records of the self-recording instruments, as the original or a copy of the same is kept in its archives.

(E) CROP SERVICE.

There is a close relation between meteorology and agriculture. As agriculture depends in great part, if not altogether, on atmospheric phenomena, it is quite natural to join to the study of the climate of a country the examination of the influence which the various meteorological elements exert on the crops in the course of the different seasons.

This crop service is modeled after that of the United States, and became part of the Philippine meteorological service by virtue of the law which reorganized the service. The Philippine crop service began in August, 1901, as may be seen in the bulletin for September of that year, and in a few months was extended throughout the archipelago, as the new meteorological stations were erected. A circular letter, copies of which were widely dispersed by means of the observers among the municipal presidentes, planters, and other persons of influence in the respective pueblos, asking them to kindly report on the various points contained in the said circular, contributed very materially to the organization of this interesting service. Owing to this measure the heads of the various stations were able to send monthly from the very beginning a short report to the central observatory bearing on the influence of the climate upon the crops during the said month, especial attention being paid to the particular products usually raised in the different provinces during the different seasons of the year.

The progress and usefulness of this service may be observed in the weather bulletins, especially those for January, February, March, April, May, June, and July of 1902. Following is the list of the municipalities which have contributed to this service from October, 1902. The districts refer to a meterological division of the archipelago which is noted on Map A.

DISTRICT I.

Provinces.	Municipalities.
Leyte	Ormoc and Maasin.
Cebu	Mandaue, El Pardo, Tuburan, Danao, Talisay, Barili, and Balamban.
Surigao, Mindanao	Surigao, Caraga, Balanga, Gigaquit, and Cantilan.
Davao, Mindanao	Davao, Mati, Dalian, and Daron.
Misamis, Mindanao	Balingasag, Rosario, and Salay.
Bohol	Tagbilaran, etc. (See the bulletin for May.)

DISTRICT II.

Capiz Panay	Capiz, Loctugan, Pontevedra, and Jamindan.
Iloilo, Panay	Carles, Calinog, Janiuay, Lambunao, Anilao, Lucena, Dumangas, Manduriao, Pototan, Pavia, Jaro, Estancia, Duenas, Alimodian, and Santa Barbara.
Negros, Occidental	Bacolod, Eustaquio, Lopez, and Binalbagan.
Negros, Oriental	Dumaguete, Nueva Valencia, Siaton, Tangjai, Dauin, Ayuquitan, Jayasan, Bais, and Bacon.
Isla de Jolo	Jolo.
Antique, Panay	San Jose de Buenavista.
Zamboanga, Mindanao	Zamboanga.

DISTRICT III.

Tayabas, Luzon	Antimonan, Isla Alabat, Calauag, Lucban, Lopez, and Mauban.
Ambos Camarines, Luzon	Nueva Caceres, Pamplona, Iriga, Nabua, and Libmanan.
Albay, Luzon	Legaspi, Guinobatan, Bacacay, Ligao, Oas, Polangui, Albay, Daraga, Camalig, Tabaco and Tivi.

DISTRICT IV.

Cagayan, Luzon	Aparri and Claveria.
Ilocos Sur, Luzon	Candon and Santa Cruz.
Benguet, Luzon	Baguio, La Trinidad, Balabac, Adaoay, Baguias, Loo, Galiano, Bocod, and Tublay y Cabayan.
San Fernando, Luzon	San Fernando, Bacnitan, Buluan, Naguilian, and San Juan.
Pangasinan, Luzon	Dagupan, San Quintin, Pozorrubio, Santa Maria, Villasis, Santo Tomas, San Carlos, Lingayen, Salasa, Mangatarem, San Nicolas, Rosales, Alcala, Bayambang, Malasiqui, Alava, Calasiao, and San Isidro.
Nueva Écija, Luzon	San Juan de Guimba, Cuyapo, Santo Domingo, Aliage, Cabanatuan, Penaranda, Cabiao, San Isidro, Bongabon, Santa Rosa, San Leonardo, and Caranglan.
Zambales, Luzon	Bolinao, Masinloc, Alaminos, Olangapo, and Iba.
Pampanga, Luzon	Arayat, Candaba, and Santa Ana.
Tarlac, Luzon	Tarlac, Anao, San Clemente, Paniqui, Concepcion, Pura, Gerona, Murcia, O'Donell, Banban, Santa Ignacia, Moncada, Capas, and La Paz.
Bataan, Luzon	Balanga, Bagac, Hermosa, Orani, Samal, and Mariveles.
Cavite, Luzon	Corregidor and Cavite.

(F) TYPHOON SIGNALS.

We have already spoken in treating of the work carried on at the central observatory of the daily weather note or forecast for the coming twenty-four hours, which is sent telegraphically to the principal stations of the archipelago, where the respective observers give it out to the public for the sake of those whom it may concern. Moreover, when any notable atmospheric disturbance is noted word is sent directly not only to the captain of the port at Manila, but also to the head officers at the other ports of the archipelago that are in connection with the central office. In these warnings, which, as may be easily understood, are different for different points of the archipelago, the director of the meteorological service usually specifies the region toward which the storm is moving, indicating the points most threatened or where the destructive effects will most probably be felt. At the same time the proper typhoon signal which should be raised at that point is indicated.

The day as well as the night storm signals used at the ports in the islands are the same as those used for many years back at the port of Manila.

Storm signals are only used in northern ports, and it is desirable that some action be taken to extend their use to all ports of the archipelago telegraphically connected with Manila.

(G) PUBLICATIONS OF THE BUREAU.

1. The report of observations for the calendar year 1900 was published about the end of the year 1901.
2. A similar report for the year 1901 was issued in August, 1902.
3. Weather bulletins for each month are regularly published.
4. A report of the climate of Baguio, Benguet, was published in June, 1902.
5. A pamphlet, Ground Temperature Observations at Manila, 1896–1902, authorized by the secretary of the interior, was given to the public printer for publication in July, 1902.
6. A pamphlet, Report on the Seismic and Volcanic Centers of the Philippine Archipelago, was also sent to the public printer for publication in July, 1902.

(H) WORK OF THE MECHANICS.

Owing to the climate a great amount of patient work is required to keep the delicate instruments in good running order. In the Manila Observatory there were in operation at the end of August, 1902:

In the astronomical department.—Two sidereal-time clocks, one with electric contacts to run the chronograph; four mean-time clocks, two with electric contacts; one 19-inch telescope with two spectrographs and photographic camera; two 3-inch telescopes for sun-spot work; one meridian circle and transit instrument for time work; one photographic reflecting zenith telescope; one chronograph; two sets of phototheodolites; one thermograph for correction of astronomical observations for refraction; one micro-seismograph to register vibrations of the equatorial pier.

In the open-air stations.—Six instruments for direct observations; five self-registering instruments.

In the magnetic department.—One complete set of self-registering photographic instruments; one thermograph to correct the magnetic observations for temperature; eight instruments for direct observations.

In the seismic department.—Five instruments for direct observations; seven self-registering instruments.

In the meteorological department.—Thirteen instruments for direct observations; eleven self-registering instruments.

This makes a total of 39 instruments for direct observations and 31 self-registering instruments, all in actual operation.

Besides the work of the mechanics in preserving many instruments in proper condition for work, they prepared, checked, and packed all the instruments sent to branch stations. They repaired many instruments from the observatory and from branch stations, some belonging to the Army, Navy, or civilian officials, and others belonging to private persons. More than fifty aneroids and some mercurial barometers have been repaired and rated by the mechanics since the time of my last report.

(I) WORK IN THE ASTRONOMICAL DEPARTMENT.

1. The standard time, viz, time of the one hundred and twentieth meridian east of Greenwich, is given every day by telegraph from the observatory to all telegraph offices throughout the archipelago, to the vessels in the bay with the time ball at noon, and to the business center by firing a gun at noon. For the latter purpose the Signal Corps established a line from the astronomical department to Fort Santiago, a little more than a mile away, and the gun is fired from the observatory.
2. Two eclipses have been observed—on November 11, 1901, and on April 23, 1902. The results are published in the weather bulletins for November, 1901, and April, 1902.
3. Regular observations of solar activity are carried on in this department, and drawings of sun spots regularly made when possible, in connection with magnetic observations, and chiefly with magnetic disturbances.
4. The most important work in this department is the rating of the chronometers. Transits of stars are regularly observed in the transit-instrument room for the purpose of rating the standard pendulum and the chronometers.

Number of chronometers rated since my last report, 33. Although these figures are low if compared with the chronometers rated before the war, yet they are about twice as large as those given in my last report.

(J) WORK IN THE MAGNETIC DEPARTMENT.

The most important undertaking during the year in the magnetic department has been a series of observations taken by Father Miguel Saderra Masó during his visit of inspection throughout the southern part of the archipelago. His account of these observations is contained in the following report made by the said Father:

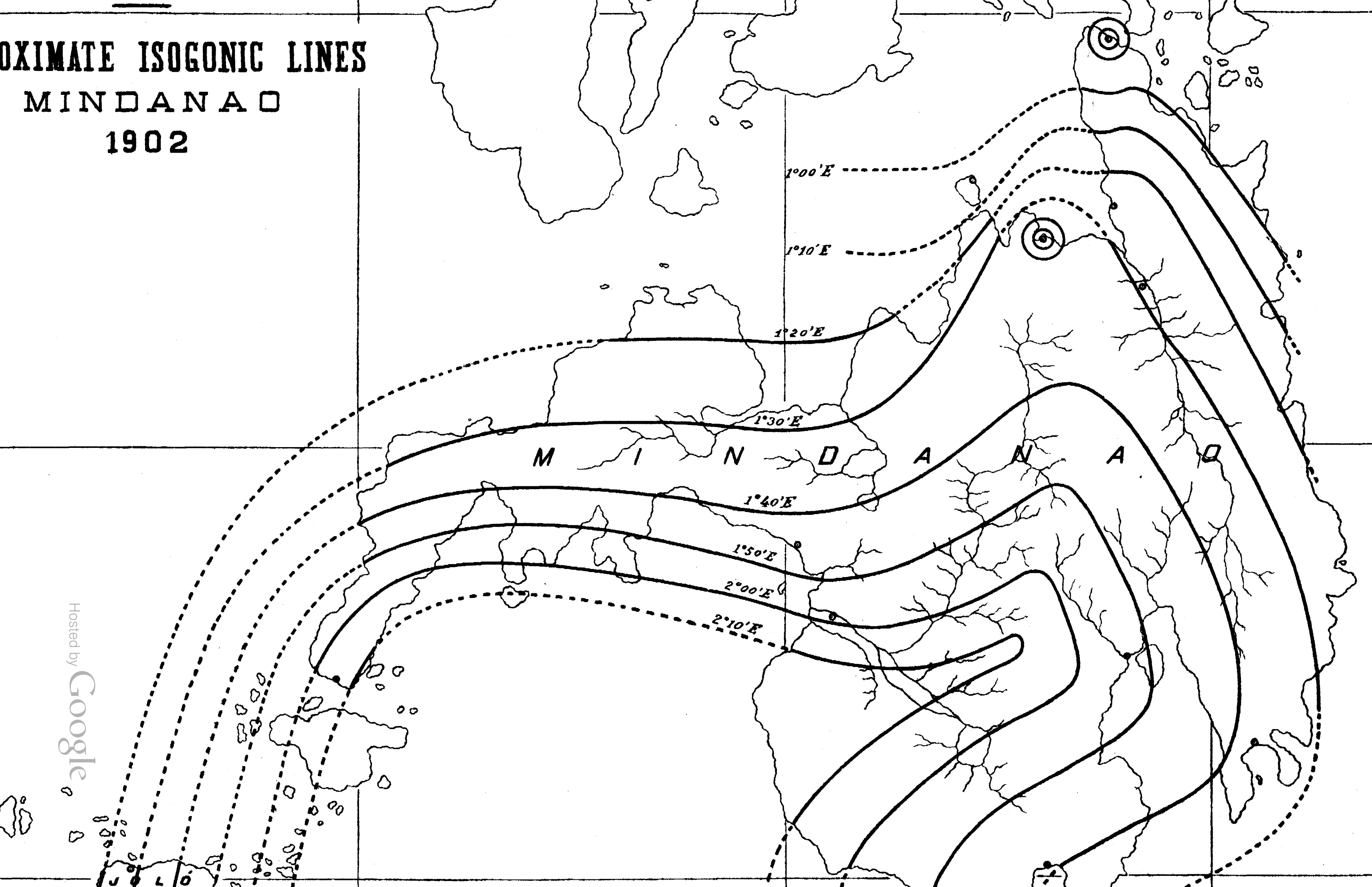
"The results of the determination of the magnetical elements made during my trip to Mindanao may be seen in the magnetical charts that accompany this report. Plates I and II represent the position of the isoclinic and isogonic lines of the island. It goes without saying that owing to the limited number of observations taken, and these only along the coasts, these lines traced with free hand are of a general character and can be only approximately true. Owing, no doubt, to the closed curve of no variation, which runs from northeast Luzon to the Japanese Empire, eastern Siberia, and the coasts of China, the isogonic lines in the archipelago follow a general west-northwest to east-southeast direction. In the island of Mindanao, as may be seen in Plate I, they suffer a strong inflection toward the north, the axis of this inflection corresponding very sensibly to the evidently volcanic terrestrial line that runs from Matutun and Apo to the Laguna of Mainit, south of Surigao. The observations made in the years 1889 and 1892 give evidence of a magnetic focus of extraordinary declination in the direction of Surigao, which fact the present observations corroborate, while at the same time they indicate another at Nasipit. Others, no doubt, of equal or greater importance, will be found in the interior of the island. These last can be located only after a complete magnetical service, comprising a great number of observations, shall have been established throughout the island.

"Plate II represents the isoclinic lines or lines of equal inclination. From them it may be seen that the magnetic equator actually passes between Basilan and Zamboanga and then cuts across the extreme south of Mindanao over the Bay of Sarangani, and lies consequently between the parallels 6° and 7° north latitude. In the isoclines also there is observed a marked inflection toward the north, in a direction parallel to the central cordillera, or the line of greatest volcanic activity of the island. The gradual increase of inclination appears less marked north of the line 0° than south of it, seeing that in the former case the average increase is 2° for each degree of latitude, while in the latter it amounts to more than 3° in the same space.

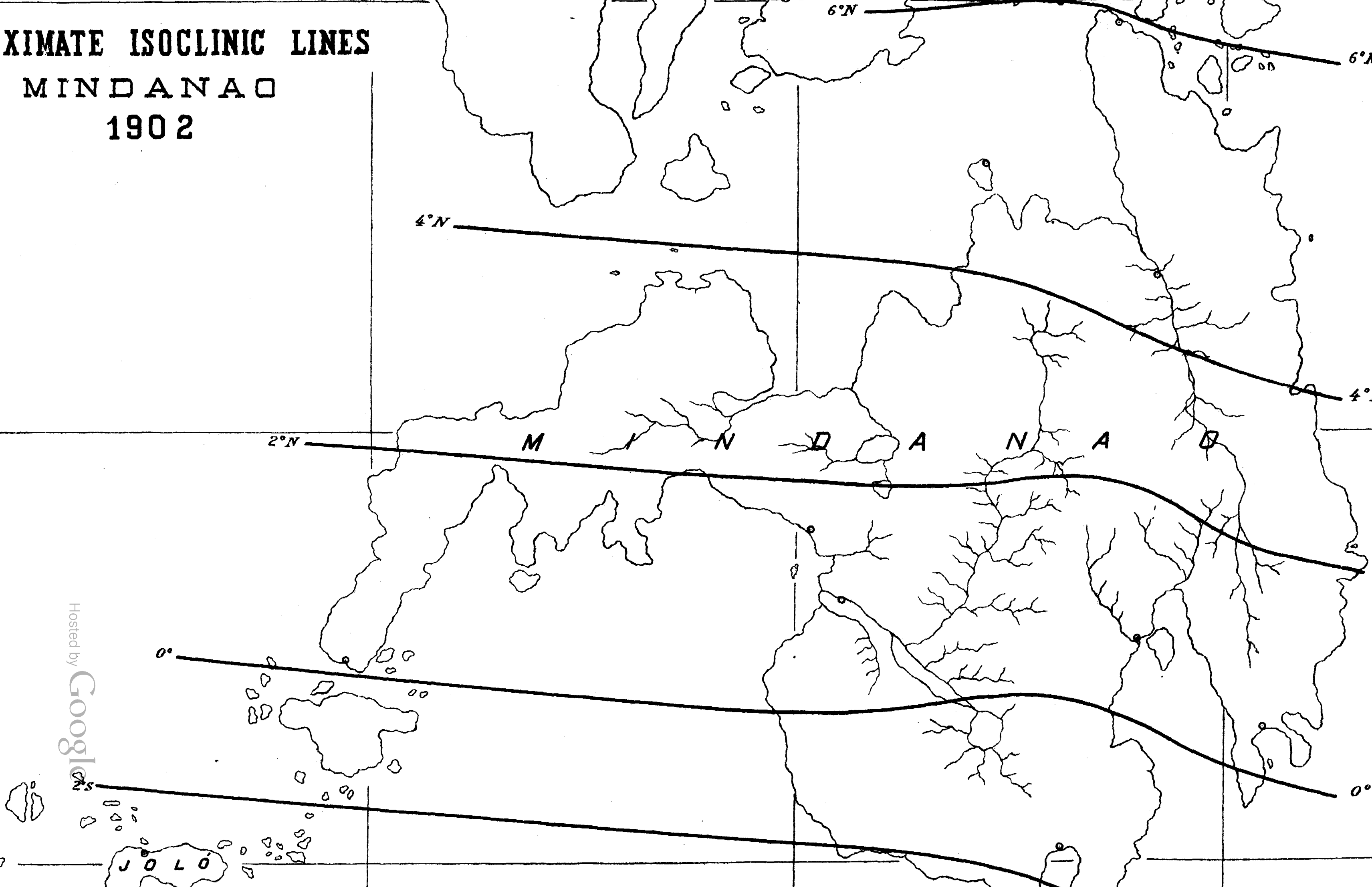
"The determinations made this year are particularly useful in showing the actual variation going on in the magnetical elements in the regions of eastern Asia. As a matter of fact, if we compare the present results with those secured in 1892, as is done in the numericable table at the end of the report, there will be noticed a progressive increase of eastern declination and a strong decrease in the inclination. The declination has varied much more in Mindanao than in Manila; moreover, the amount of variation is more accentuated in the east and south, so that if we were to trace a line of maximum secular variation a curve would result, which, running along the eastern coasts of the island, would take a bend to the south and stop at Jolo. An increase in the H. component was found at all points of observation, thus confirming observations made in Manila, Hongkong, and Zikawei. If we compare the variations described above with the variation observed in the declination and inclination at different points of the eastern regions of Asia, we find them in perfect accord. Examining the variation of these elements as observed at Zikawei, Hongkong, and Batavia, during the period between 1892 and 1899, the only complete data on the subject we have at hand, it is seen that the declination west has been continuously on the increase at Zikawei, while the declination east has been continuously decreasing at Hongkong and increasing at Manila and Batavia. These facts may perhaps be explained by supposing, as seems probable, that the closed curve of no variation spoken of above possesses a slow movement toward the north, suffering a constant deformation by an enlarging of its minor axis, which lies east and west. As a result of this deformation, the western quadrants are receding from Zikawei, since this point is within the 0° curve, resulting, consequently, in an increase of western declination. For the same reason the southwest quadrant is approaching Hongkong, which is outside of the curve, and the natural result is a diminution of eastern declination at that point. As far as Manila is concerned, the movement of the said curve northward ought to produce there an increase of eastern declination, though somewhat counterbalanced by the approach of the southwest quadrant. This last factor may be the cause of the slight amount of variation observed at this point. The notable increase of declination throughout the whole of Mindanao, which is farther east than Manila and far south of it, can, it seems to us, be accounted for only by the movement of the said curve toward the north.

"At all points the inclination north showed a notable decrease, while the inclination south is increasing in Batavia, which goes to show that in these regions the 0°

OXIMATE ISOGONIC LINES
MINDANAO
1902



XIMATE ISOCLINIC LINES
MINDANAO
1902



line, or magnetic equator, is advancing northward. The amount of variation decreases toward the poles. At Manila it is practically equal, though with the opposite sign to that at Batavia.

"Before bringing this report to a close I shall add a few words relative to the ordinary work carried on during the past year in the magnetical observatory. Two series of apparatus (Mascart pattern), declinometer, bifilar and balance, have been in regular and constant use, one set for direct reading and another self-registering by a photographic process. Four times a month the magnetical elements of declination, inclination, and horizontal force are determined by the Elliott unifilar magnetometer and Dover inclinometer, for determining a base line and reducing the readings of the registering instruments to their absolute value. The record thus taken from the hour to hour observations of the three principal elements, i. e., declination, H. F. and V. F., is published in the monthly bulletin of the observatory.

"Among the unusual undertakings carried on during the year, in addition to the determination of the magnetical elements during my trip through Mindanao, may be mentioned the cooperation of the observatory in the programme formed by the scientific commission of the German and English Antarctic expeditions. However, this programme could not be carried out in all its details, since, on account of the system of registering instruments in use here, the modifications of some of the instruments of precision could not easily be made. Some special magnetical observations were sent to Mr. Bauer, of the Coast and Geodetic Survey, Washington, D. C., for use in his study of the magnetical variation throughout the globe during the total eclipse of 1900, as well as the curves of the perturbation that occurred simultaneously with the terrible eruption of Pelee, in Martinique. Finally, in the beginning of May of the present year, all the facilities of the observatory, including data and apparatus, were put at the disposal of those members of the Coast Survey who had been sent to verify their instruments.

"I believe that the work of this department is of undoubted value, and not inferior to that done at other magnetic observatories; but I regret to be obliged to state that in the future the work done here will soon be rendered practically worthless, not only on account of the proximity of the projected electric car lines, but also on account of the wires of the electric-light system along the neighboring streets, and even the influence of the corrugated iron roofing of the numerous stables and wagon sheds lately erected by the civil government within a few yards of the magnetical building. Even at the present moment the wires of the arc lights influence the needles to a slight though quite visible extent. The actual influence which the above-mentioned iron stable roofs must exert has not been calculated, owing to the fact that the weather has not afforded us a sufficient number of consecutive clear days which would be necessary to enable us to take a series of observations and comparisons at different points in the observatory grounds. Besides, it seems better to await the conclusion of the plan of the stables, as the building of said edifices is still going on.

"Allow me, before concluding this report, to mention the valuable and conscientious work carried out by the first-class observer, Mr. D. C. Dulueña, not only in the routine work of the magnetic observatory, but also during my tour of inspection, during which he rendered valuable services in the determination of the magnetical elements, as well as in the establishing and fitting up of the meteorological stations.

"Respectfully,

"José Algué,
"*Director of the Philippine Weather Bureau.*"

	Declination.			Inclination.			Horizontal force.		
	1892.	1899.	Variation.	1892.	1899.	Variation.	1892.	1899.	Variation.
	° ′	° ′	° ′	° ′	° ′	° ′			
Zikawei	2 14.45 W.	2 20.26 W.	+0 05.81	46 06.97 N.	45 47.58 N.	−0 19.39	0.32500	0.32825	+0.00325
Hongkong	33.55 E.	21.05 E.	−0 12.50	32 03.52 N.	31 29.37 N.	−0 34.15	0.36352	0.36676	+0.00324
Batavia	1 36.33 E.	1 13.53 E.	−0 22.80	28 52.69 S.	29 50.72 S.	+0 58.03	0.36776	0.36766	−0.00010
	Jan. 1, 1892.	June 20, 1902.		Jan. 1, 1892.	June 20, 1902.		Jan. 1, 1892.	June 20, 1902.	
Manila	51.10 E.	53.19 E.	+0 02.09	17 11.00 N.	16 04.94 N.	−1 06.06	0.37629	0.38231	+0.00602
Surigao	2 04.04 E.	2 16.32 E.	+0 12.28	6 43.06 N.	5 55.12 N.	−0 47.94	0.37818	0.38139	+0.00321
Cantilan	1 11.00 E.			6 10.60 N.			0.37886		
Mambajao	49.40 E.	1 02.12 E.	+0 12.72	6 00.30 N.	4 54.14 N.	−1 06.16	0.37575	0.38070	+0.00495
Fandag	1 03.30 E.			5 22.30 N.			0.37737		
Cabarbaran		1 23.85 E.							
Nasipit		1 53.63 E.							
Butuan		1 29.36 E.			4 45.12 N.			0.38166	
Dapitan	1 16.10 E.			4 59.60 N.			0.38024		
Tagoloan	1 33.20 E.						0.38123		
Bislig				4 33.00 N.			0.37815		
Malabang		1 42.43 E.			1 38.53 N.			0.38707	
Cotabato		1 58.04 E.			1 34.80 N.			0.38730	
Caraga	1 23.20 E.			2 08.70 N.			0.37995		
Davao	1 36.40 E.	1 54.44 E.	+0 18.04	1 18.00 N.	0 19.52 N.	−0 58.48	0.38000	0.38303	+0.00303
San Jose	1 28.60 E.			1 18.00 N.			0.37812		
Matti	1 09.90 E.	1 37.78 E.	+0 27.88	1 58.60 N.	1 03.31 N.	−0 55.29	0.37710	0.38082	+0.00372
Zamboanga	1 59.70 E.	2 06.44 E.	+0 06.74	1 40.10 N.	0 19.42 N.	−1 20.68	0.38270	0.38516	+0.00246
Santa Cruz	1 30.40 E.			1 26.00 N.			0.37940		
Jolo	1 12.70 E.	1 27.31 E.	+0 14.61		2 45.54 S.		0.38540	0.39014	+0.00474
Macar		1 42.26 E.			1 38.48 S.			0.38556	

APPENDIX Q.

REPORT OF THE CHIEF OF THE BUREAU OF NONCHRISTIAN TRIBES FOR THE YEAR ENDING AUGUST 31, 1902.

BAGUIO, BENGUET, *September 1, 1902.*

The SECRETARY OF THE INTERIOR FOR THE PHILIPPINE ISLANDS.

SIR: I have the honor to submit the first annual report of the bureau of non-Christian tribes.

ORGANIZATION AND OBJECTS OF BUREAU.

The bureau of non-Christian tribes for the Philippine Islands was organized under the department of the interior by act No. 253, October 2, 1901.

The Spanish classification of the peoples of the Philippines was ecclesiastical in form, dividing the inhabitants of the archipelago into Christians, heathen (infieles), and Mohammedans (Moros). The legislation of the Philippine Commission, both provincial and municipal, previous to the formation of this bureau (with the exception of the acts organizing the province of Benguet), had not taken into consideration and is not applicable to the latter two classes. The term "non-Christian" designates the pagan and Mohammedan tribes, in distinction from the Christian Filipinos dwelling in organized provinces and towns, for whom a frame of government had been practically completed as early as a year ago.

The objects of the bureau as stated in the organizing act were two: First, to investigate the actual condition of these pagan and Mohammedan tribes, and to recommend legislation for their civil government; and second, to conduct scientific investigations in the ethnology of the Philippines.

REVIEW OF PHILIPPINE ETHNOLOGY.

Of the peoples and tribes brought within the comprehension of this bureau, the most insufficient knowledge has been left us by the former rulers of the archipelago. Spanish explorations and conquest in the Philippines, conducted with the utmost rigor for the first few decades after the arrival of Legaspi, almost entirely ceased at the end of fifty years, and the limits of missionary enterprise and political authority rested where the Spanish conquerors of the first half century left them. Thus all northern Luzon, except the slender strip of Ilokano coast and the narrow margin along the Rio Grande de Cagayan, occupied by the Christianized Ibanag, has continued to be held by a large number of heathen tribes of low Malayan culture, while the islands of Mindoro and Palawan and nearly the whole of the great island of Mindanao, with the Sulu Archipelago, are still unexplored and only imperfectly subject to governmental authority.

In geographic extent these areas embrace hardly less than one-half of the entire archipelago. Of the actual numbers included in these pagan and Mohammedan tribes only the roughest estimates, based on Spanish calculations, can be given, but the total number has been stated at from 1,500,000 to 2,000,000 souls. Information is also most uncertain as to the real number of tribes embraced in this body of people. Some enumerations have placed the number as high as seventy distinct tribes, but it is our belief that research will somewhat reduce this number.

The most ambitious attempt at the ethnology of the Philippines is that of the celebrated Austrian professor, Ferdinand Blumentritt, whose classification may form a starting point for further research.

Data of every sort are too insufficient to enable anyone to form more than a working outline of Philippine ethnology, but in the following paragraphs is given a tentative classification of native peoples.

While the vast bulk of the population is unquestionably of Malayan origin, the aboriginal race of the archipelago is the dwarf, black people, known as "Negritos," or little negroes. This race is almost the smallest on the globe, and while suggestively negroid in their dark color and frizzly mops of hair, they have neither the prognathism nor the dolichocephaly of the African and Melanesian. They are true savages, depending for food upon the chase and wild roots, neither living in villages nor building stable huts, but roaming through the mountains in small groups of a few families each. They are timid and fearful of approach, and yet to a certain extent are feared by the more civilized inhabitants of the islands. The distribution of these Negritos has been studied by Meyer, but recent correspondence conducted by the bureau reveals their presence in several hitherto unrecorded regions. It has been invariably stated that their numbers are dwindling, and recent estimates have placed them as low as 10,000, but the bureau's correspondence and field investigations seem to indicate that they are at least holding their own at the present time, and no less than 30,000 have been accurately reported to us from all parts of the islands.

The number of problems presented to the ethnologist by these little blacks is almost bewildering. What place have they in the evolution of man? Their identity with the Sakais of the Malay Peninsula, and the Mincopies of the Andaman Islands, is almost certain, but what is their relation to those other pigmies—the dolichocephalic dwarfs of Central Africa? And further, what may be their connection with the true negro race of Melanesia, almost contiguous to them? The geographic distribution of the Negritos is such that we must conclude that at one time they were practically the sole possessors of the Philippine Archipelago; and unquestionably the first to arrive and to dispute their possession of the soil and to drive them into the mountainous interiors which they now occupy were the tribes of primitive Malayans which still constitute the most considerable element of the non-Christian population of the islands. Blumentritt believes in two successive waves of these Malayans of low culture, and he attempts to fix approximately the periods of their migration. Among such tribes are the great Igorrote family of the Cordillera Central of Luzon, the Tinguianes, Dadyags, Calingas, and numerous others, of whose tribal affiliations we at present know nothing. Certain tribes, like the Ifugao, appear to be mixed Negrito-Malayans, but the frequently met with hypotheses of Chinese and Japanese admixture in certain tribes of northern Luzon appear to me to be questionable; nor do I see any reason for believing in the two-migration theory of Blumentritt as applied to these primitive Malayans. The most we can affirm at present is that the great mountainous mass of northern Luzon is occupied by numerous tribes speaking different dialects of common Malayan origin. These tribes are on a similar culture plane with the primitive Malayan tribes of the Malay Archipelago, such as the Dyaks of Borneo and the Battaks of Sumatra. They have the same barbarous practices of headhunting and ceremonial cannibalism, and wage the same community feuds. The inference is strong that all arose from a common migratory movement and belong to a common culture epoch in the history of Malayan peoples. The same element is probably represented in the central and southern islands of the archipelago, as well as in northern Luzon. The mountains of nearly all the Visayas contain, besides roving bands of Negritos, communities of wild Malayans. These peoples bear different names in different places: "Igorrotes" on Mount Isarog, "Buquidnon" in Panay, "Babylanes," "Pulijanes," and "Mundos" in Negros, elsewhere "Montescos" and "Remontades." The origin of these groups may be twofold. Some of them may be remnants of the primitive Malayan folk here previous to the coming of the Filipino tribes now Christianized, and, as such, they would be grouped with the tribes of northern Luzon. But it is probable that certain bands are made up simply of Filipinos who have fled to the mountains from the more ordered life of the plains. Outlawry or expulsion is the common form of punishment among all Filipino peoples, and to break from the associations of ordered and civilized life is the unvarying habit of the man who has inflicted injury, or who has himself been wronged. In the history of Spanish administration entire towns have been depopulated through this practice of their inhabitants. The outlaw—"filibustero" or "tulisan"—is an ever-present type of Malayan society.

The primitive and exceedingly interesting tribes, the Tagbanuas of Palawan and the Calamianes Islands and the Manguianes of Mindoro, would seem to be of Malayan and Negrito stocks commingled. Many of the tribes of Mindanao are also probably referable to this early Malayan immigration, particularly those of the northern and western provinces. But in the vicinity of the Gulf of Davao and Mount Apo, eastern Mindanao, we encounter tribes whose character raises one of the most interesting problems in ethnology. Among these are the Guiangas, Atas, and Tagabanas. They are reported to be very tall in stature, with hair wavy rather than straight, a narrow and prominent nose, and a color of skin approaching that of the Polynesians. Obviously, these are not the physical characteristics of the true Malay. If thorough investigation proves the existence of this type, we must conclude that we have another non-Malayan element in the population of the archipelago. Perhaps the first to call attention to the character of these tribes was Montano, who some twenty-five years ago visited the coast of Davao and ascended Mount Apo. Following the theory already developed by Hamy and other French writers, he calls these "Indonesian." The whole Indonesian theory is ignored by Blumentritt and other German writers, but within the last few years it has received the warm assent of the English ethnologist, Mr. A. H. Keane. But Mr. Keane is certainly far in error when he refers to the Indonesian element the Igorrotes and other tribes of northern Luzon. These latter, by every test, physical, linguistic, and cultural, are Malayan.

There still remain two of the most important divisions of the population of the Philippines. These are the seven great tribes of Christians which form politically and socially the Filipino people, and the Mohammedan Malays, or Moros of Mindanao and the Sulu Archipelago. The seven Christian tribes are the Visayans, occupying the central islands and the northern coast of Mindanao, the Bicols of the southern extremity of Luzon, the Tagalos of central Luzon, the Pampangos and Pangasinanes of the central plain of the island, the Ilokanos of the northwest coast, and the Ibanag of the Cagayan valley. These seven tribes almost certainly represent a Malayan migratory wave subsequent to that of the primitive Igorrotes and comparable tribes. On the arrival of the Spaniards they were already occupying the coasted plains and river valleys, having forced back into the interior the less-cultured tribes which had preceded them. The languages of these groups, while differing widely in their vocabularies, show a common Malayan source and a uniform structural basis. At some time and place at least several of these tribes felt the contact of the Hindu civilization, which, subsequent to the Christian era, flourished in Java and the Malay Peninsula. From this source they acquired alphabets, the knowledge of writing, and other arts of civilization, which considerably elevated them above the plane of the interior tribes. A Sanscrit element, especially in the Tagalog, as has been shown by Dr. Pardo de Tavera, exists in these languages.

Of all the pre-Spanish peoples of the Philippines, the last comers are the Mohammedan Malays. We can readily fix the time of their arrival as subsequent to the thirteenth century. For the Mohammedan Malay, so prominent in the history of the Eastern Archipelago as colonist, trader, and pirate, whose speech is the lingua franca of all Malaysia and the Indian Ocean, and who has given his name to, and stands as the type for the entire race, was, previous to the twelfth century, only an obscure tribe of Sumatra. The conversion of this people to Mohammedanism by Arabic missionaries in the twelfth century appears to have given them the power and passion which has made them dominant everywhere south of the Visayan Islands of the Philippines. They arrived in the Sulu Archipelago probably between 1300 and 1400 A. D. And upon the coming of the Spaniards in the sixteenth century their fleets of praos were filling the Mindoro Sea and sweeping the Straits of San Bernadino, while their outposts and settlements reached to Manila Bay. The Spaniard checked their further progress in the Philippines, though he utterly failed after centuries of conflict to reduce them to Christianity or obedience to the Spanish Crown. Their history is the climax of Malay piratical power and the scourge of the Maguindanao sea rover was felt for centuries for a thousand miles both north and south of their strongholds in Jolo and Lanao.

Of such diverse and varied elements, then, is the population of the Philippines composed. Of the mixtures with Chinese and European blood it is unnecessary to speak further here. The variety of problems they present is equally great for the ethnologist and the statesman, and nowhere, it may be asserted, must the constructive work of administration be so dependent for information and guidance upon the researches of the expert student. Since the first arrival of the Portuguese in Eastern waters the mind of the Malay has appeared to the European as a closed book. Both races have ever misunderstood and mistrusted each other. Out of mutual ignorance and fear have followed hatred, oppression, and retaliation. In the establishment of order in these islands this government is attempting to rear a new standard of relationship between the white man and the Malay. The success of this effort, so full of possibilities for the future of life and intercourse in the Far East, will depend in a large measure on our correct understanding and scientific grasp of the peoples whose problems we are facing. Science can have no nobler mission than to discover and interpret the best inherent in every people, nor can a more practical and exalted work be found than that of this and similar bureaus in the promotion of a better understanding between the races.

OFFICE WORK OF THE BUREAU.

In addition to the routine paper work of the bureau, the employees in the office have pursued the following line of work:

First. Copies of a circular requesting specific information upon the population, which, previous to the organization of the bureau, had been prepared by the Hon. Dean C. Worcester, have been sent to every provincial governor and to every organized municipality in the archipelago. About nine hundred replies have been received, a percentage of 90 per cent of those sent. The ethnological information contained in these replies, is, as should be anticipated, somewhat meager, but a mass of valuable demographic data is afforded. In every case the replies give credible enumerations of population. A study of these returns show the extent of intermixture between the Christianized Filipino tribes; the weaving of population as stimulated by the recent revolution; the migratory tendency of certain tribes, like the Ilokano, who is leaving his narrow coast in search of homes and labor elsewhere; the distribution of Chinese in the archipelago, etc.

In spite of the fact stated above that the bulk of this correspondence is limited in its ethnological value, there are notable and interesting exceptions. In a goodly number of instances the responses have been accompanied by relaciones upon non-Christian peoples, particularly the Negrito, dwelling in the mountainous vicinities of the Christian towns. These productions bear usually the signature of the municipal president, but they appear to be joint productions of all the officials attendant at the "tribunal" (municipal building). They reveal painstaking care, fair perception of what constitutes scientific data, and a decided enthusiasm for the investigation.

The bureau prepared and printed early in the present year a brief circular containing a summary of the ethnological problems of the Philippines, with directions for prosecuting preliminary scientific investigations and for collecting museum material. Copies of this circular were distributed quite widely in the islands and some excellent data were in this way secured.

The correspondence occasioned by the two above publications has been filed in the office of the bureau, and a system of card index and cross reference devised which makes it readily available. The card index is arranged in a threefold way: According to contributors' names; according to Filipino tribes; and according to provinces.

A similar card index for all printed publications, including books, reports, and magazine articles, bearing upon Philippine ethnology, has been begun.

A map collection and file has also been begun. Copies of current maps are being preserved and search is being made for old and rare examples showing the history of geographical and ethnological knowledge of the islands. Some interesting examples of this latter class were recently obtained by the chief of the bureau in the United States.

The beginnings of a library have been made. It is the intention to build up a collection containing everything procurable pertaining to the ethnology, demography, geography, philology, and history of the islands. A few works of rarity and value were obtained by the chief of the bureau in the United States, but the collections of Europe contain most of the works that have been produced in or upon the Philippines. A small working library was purchased in the United States which bears upon the ethnology and geography of Malaysia, Polynesia, and Australia; also upon Mohammedan religion, custom, and law; codification and application of Hindu law in India; primitive law and custom; and general anthropology. Search for books in the islands has so far secured us little beyond works on Philippine languages. Here some rare things have been secured; for example, both the early editions, 1727 and 1735, of Bergano's Arte de la Lengua Pampanga. The bureau has the latest and most complete grammars and dictionaries of Tagalog, Ilokano, Ibanag, and Visayan. Modern editions have also been purchased of some of the old Spanish historical accounts of the islands.

A considerable amount of translation from Spanish, French, and German into the English has been done. Several typewritten copies of each such translation are made for use of the workers in the bureau.

The syllabus prepared by the Hon. Dean C. Worcester, based on Powell's Introduction to the Study of American Languages, has been partially supplemented and prepared for publication. The proposition for the republication of Powell's work, especially adapted for use in the Philippines, was made to the Bureau of American Ethnology last March, and their generous consent was given. The final preparation of this work for the press has been awaiting the arrival from Washington of Dr. Jenks, assistant chief of the bureau.

Of the work of the agent for Moro affairs at Jolo, I can speak only of what information I have gained through correspondence. He continues to act as interpreter for the army officers at Jolo. He has forwarded a small amount of interesting matter relating to the Moros of Jolo. This includes a brief codification of Jolo law translated into English; a pact between datos, date not given, establishing their prerogatives under the suzerainty of the Sultan; a sketch map of, and some notes on, the island of Jolo, and a brief Jolo-English vocabulary.

WORK OF THE CHIEF OF THE BUREAU.

Since the organization of the bureau that part of his time not demanded by other duties has been devoted by the chief of the bureau to study and the collection of data. The following lines have been pursued and note books opened therein:

First. General history of the Philippine Islands and peoples since their discovery. This study has been pursued to gain a broad basis for anthropological work. The old Spanish historians of the islands, contemporaries of the conquest, especially Morga, Combe, Gaspar de San Augustin, and Navarrete, have left us books rich in ethnographic material. Pigafetta, the historian of Magellan's voyage, of which expedition he was a member, gives an indispensable description of the Visayan islanders when first seen by the Spaniards. Another fruitful source of information on the Philippines from century to century has been found to be in the famous collections of voyages such as Hakluyt, Harris, Churchill, and Pinkerton.

Second. The general ethnological problem of the Philippines. The bulk of helpful literature here is the work of German and French scientists. It exists largely in scattered articles in scientific publications and reports of learned societies. On Mindanao, much good material can be found in the volumes of Jesuit letters, Cartas de Mindanao.

Third. Spanish legislation for and administration of the pagan tribes of the archipelago. The preparation of this paper is proving a somewhat slow task, but eventually a separate report will be submitted thereon.

Fourth. Historical review of the Spanish relations with the Mohammedan Malays of Mindanao and Jolo.

Fifth. Caciquism, or the prevalence in the Filipino community of the arbitrary authority of a special class.

Sixth. Philippine languages. In the absence of a specialist in this subject, study has been pursued during the last few months upon the two languages, Tagalog and Ilokano. The scientific importance of language study is fundamental, and will demand large attention in the future from all workers in the bureau.

Of field work only a small amount has yet been done. The duties attending the first organization of the bureau and the absence of the chief in the United States for several months have delayed the prosecution of this most important of all work of the bureau. A subsequent paragraph will detail the field work which is now being entered upon. In the early winter brief visits were paid to small groups of Negritos in the different provinces of Bataan, Pangasinan, and Rizal. Brief vocabularies, all showing much corruption, were procured; a series of measurements were made upon a small number of individuals, both male and female, and a small amount of ethnographic data obtained. Since early in June the chief of the bureau has been studying the social organization of the Benguet Igorrotes. An admirable volume of manuscript notes upon these Igorrotes by Mr. Otto Scherer is in the possession of the bureau, and may serve as a guide and companion to further investigations. Dr. A. E. Jenks has also just reached this field and is at work upon the general economic life of the Igorrotes.

Under instructions from the secretary of the interior a special trip was made by the chief of the bureau, July 25 to August 17, to establish a quarantine system against cholera for the non-Christian tribes. The route taken was northward through Benguet, then down the Amburayan River to the coast, northward through Ilocos Sur to the old comandancia of Tiagan, and thence south across Lepanto, entering Benguet again on the Agno River. A special report will be submitted on the results of this trip, but it may be stated here that the journey was productive of scientific information in addition to the immediate object in view.

INVESTIGATION OF THE ADMINISTRATION OF INDIAN AFFAIRS IN THE UNITED STATES.

From the month of December to the end of May the time of the chief of the bureau was occupied by a visit to the United States. Under instructions from the Philippine Commission, visits of investigation were made to Indian reservations and schools in both the Eastern and Western sections of the country. These visits had several objects in view. In the first place, it was desired to gain information as to the results obtained by the present administration of Indian affairs. A dozen years ago a new policy toward the Indian was inaugurated by the Government. Congress and the Administration at Washington, since the first Indian treaties early in the last century, had followed the policy of dealing with the Indian by tribes, and the Supreme Court, since the decision by Chief Justice Marshall in the case of the Cherokee Nation, had recognized for the Indian a distinct nationality. The new policy proposed to do away with tribal relationships, break down tribal ties, and to deal with the Indian as an individual. Provision was made by Congress for the breaking up of reservations and the allotment of land in severalty. An elaborate system of education, embracing both reservation and boarding schools, has been established.

In spite of the excellent intentions behind these efforts, the policy, in the opinion of the undersigned, has not brought forth satisfactory results, and in a thousand cases has not done justice to the Indian. The process of change has been pursued too rapidly. Great difficulties attend the disestablishment of the reservation system. The Government originally set aside large tracts of land for the Indian tribes' perpetual use, and by promise and treaty guaranteed them the occupancy of these tracts under their customary laws, while it limited and confined them to these areas for their homes. In nearly every such case one of two things has occurred. Either by the approach of white settlers, the extermination of game, the diversion of irrigating waters, or other changes brought about by the settlement of the West the reservation has proved too small or too arid to sustain the tribe or to permit the development of its well-being; or, on the other hand, an opposite result has been reached where either through the diminution in numbers of the tribe or the disinclination of its members to pursue agriculture large tracts of the most fertile land, capable of affording homes for thousands of settlers, have been left unoccupied and unimproved. Under this last condition the temptation has proved irresistible to reduce the size of the Indian reservation by throwing open a portion of the land for white settlement. This process is effected ostensibly with the consent of the Indian, and a number of special agents are employed by the Indian division to make terms with Indian tribes, but in reality there appears never to be a free consent on the part of the tribe. This process is being pressed in many parts of the United States at the present time, especially in Indian Territory and on northern reservations occupied by tribes of the great Sionan stock.

Necessary as these measures seem to the development of the West, they are violations of the most solemn promises made to the Indians by the Government of the United States that the lands should be theirs "as long as the grass grew or the water ran." No solution of the problem of the Indian's status and land possession can be considered satisfactory which rests upon such palpable breach of faith.

I believe that the employment of the reservation system should be avoided in these islands, and that the government should not cede or grant any public land to a tribe as a tribe. In some cases it may be necessary for a term of years to exclude new settlers from the habitats of certain tribes, temporarily reserving these areas for their exclusive occupation. Such measures may be necessary in order to protect and properly handle some of the Negrito tribes—as, for example, the numerous body in the southern Zambales Mountains, between whom and the adjacent Filipino folk amalgamation is impossible. But in the case of the mountain tribes of Malayan origin, on a lower cultural plane than the Christian Filipino, I believe governmental efforts should tend to encourage admixture rather than to maintain isolation. These tribes have advanced to the point of understanding individual ownership of property in, at least, improved lands. And the assignment of individual holdings can be speedily effected, leaving superfluous land open to settlement from outside. In general, it might be stated that the policy of the United States in dealing with the American Indian contains little that can be followed in governing the backward races here. The history of this policy is not, however, without its lessons. One special field of enlightenment lies in the decisions of the Supreme Court of the United States upon the Indian tribes. The limits of the legislative power, as so defined, would appear to be of special consequence to the legislative body formed under Congressional enactment in these islands. These cases cover a long period of years—almost from the beginning of the last century—and declare the competence of Congress in reorganizing tribal independence, defining Indian status, negotiating treaties, controlling Indian trade, and the possible extent of the power of agents and other officials. An especial investigation of these constitutional cases is being made, and will be submitted as a report upon the limits of legislative power over uncivilized tribes as defined by the Supreme Court of the United States.

My recent examination of Indian education in the United States impressed me as especially unsuitable and disappointing in its results. A number of large boarding schools in both the East and West are being maintained at very heavy expenditure of public funds. But in no case within my knowledge do these schools assist in fitting the Indian for the life he of necessity must lead. The courses of study are imitations of those of American city schools. The so-called industrial education bears no relation to the life from which the Indian comes and to which he should return. The Indian is above everything else a country dweller, while the whole aim and expectation of these schools seem to be to force him into town or city life. His hope lies in becoming a good agriculturist and stock raiser. These schools incompletely teach him trades and professions in which he can not compete and which he can not successfully practice. For example, in the shops of several of these schools harness making is taught, but nothing of saddlery or leather tanning, the only branches of harness work which many tribes are at present ready to employ. The study of each trade is pursued entirely without reference to the need the Indian will fill in his own home. The same criticism applies to blacksmithing, where the ironing of wagons is taught, but in no case horseshoeing or ordinary implement repairing. The whole system is exceedingly expensive and is nearly useless to the Indian.

Reservation schools in the United States have done an infinitely better work, and their plan can be more profitably followed here in this archipelago.

The immediate objects which education should pursue among the tribes here seem to be two: First, the teaching of English to the child, with reading and writing. This primarily that we may understand him and he us, in order that he may make known directly to the government officials his needs and wrongs, and in order that in general society may be liberalized and the ordinary man, who in these Malayan communities is in a state of subjection, may be freed and elevated. The second object of education among these races should be of an exceedingly practical character—being largely industrial; and in each case it should be planned to meet the needs of the tribe.

The best type of school to meet these aims will be the boarding industrial school planted in the center of each considerable tribe. Beginnings should be small. Two or three experienced American teachers with inexpensive equipment are adequate for the experimental stage. The past practice of hiring Christianized Filipino teachers for non-Christian towns is unqualifiedly condemned as fruitless, distasteful to the lower race, and frequently a source of abuse, while the present plan of sending American teachers to small Igorrote communities to conduct a primary school with a handful of naked pupils is expensive in effort and money beyond any possible justification.

For a number of years the preservation of peace and the adjudication of ordinary offenses have been performed on the reservations of the United States by Indian police and by courts for the trial of Indian offenses. The Indian police act under orders of the agent, who also sits as magistrate in the court, together with Indian assessors who assist in arriving at the facts and making decisions in accordance with Indian customs. These practices seem to have worked well. It is possible to clothe an American Indian with authority among his own people and to support him vigorously in the exercise of his powers with minimum risk of his perpetrating injustice. I feel sure, however, that the same system can not be as generally applied in this archipelago.

Society among the American Indians is thoroughly democratic. The authority of the so-called chieftain is not due primarily to descent or to noble blood, neither is it based on wealth. It is due to courage, skill as a warrior, sagacity—that is, to purely personal characteristics—and to the strength of an Indian's "medicine." Moreover, the Indian has a strong sense of justice and fair play, and the Indian official can carry out his orders, not merely because he has the authority of the United States above him, but because he has the strong support of the Indian community. Oppression is almost impossible for him, even were he inclined to it. Now, Malayan society, as we find it in the Philippines, is not democratic in its tendency, but is oppressively aristocratic. The power of the man of wealth, position, or inheritance is inordinate. He is not only able to commit abuses, but is morally blinded to their enormity. Beneath him the man of poverty and unenlightened mind takes rank with the animals that till the soil. I believe that this characterization is true of both Christian and non-Christian communities. The intrusting of authority, then, especially police and judicial authority, should be safeguarded and restricted in every possible way.

INVESTIGATION OF ETHNOLOGICAL WORK IN THE UNITED STATES.

It can be asserted without national prejudice that the science of ethnology has in recent years made its most significant progress in the United States, and that in the American school of ethnologists there is the greatest promise for the future of the science. In Great Britain, France, Scandinavia, and Belgium the science of anthropology has developed out of and still remains largely identical with prehistoric archaeology. To this field of inquiry in France, largely through the work of Broca and his disciple, Tapinard, has been built up a science of physical anthropology having for its special subjects of investigation the races of western Europe.

While in Europe anthropological students have necessarily been limited in their material to relics of prehistoric culture and to the physical types of their own race, in America they have been brought face to face with a great and intensely conservative race, with languages and institutions far removed from those of the Caucasian. Since the first settlement of white men in America the Indian has continually affected his history and has forced himself perpetually upon his attention. Thus with perhaps what will eventually be recognized as the greatest of all ethnological laboratories at his hand, the American student has possessed an inestimable advantage over the ethnologist of Europe with his far more limited material.

A sociological direction was given American ethnology by the researches of the late Mr. Lewis H. Morgan among the Iroquois. His results were revolutionary when applied to the science of the origin of society, and they received a brilliant application in the studies of Mr. Adolf Bandelier into the constitution of Aztec society. The organization of the Bureau of American Ethnology by Maj. J. W. Powell, in 1879, gave definite form and direction to the study of Indian tribes. The most conspicuous work accomplished in America lies not so much in the field of physical anthropology, nor in the study of ethnological problems having a biological character, as it does in the investigation and illumination of the thought, spirit, and motives of barbarous society.

The work of the Bureau of American Ethnology, which far more than any similar organizations, is furnishing a constant output of progressive investigations, is grouped about the following lines: Linguistics, technology and æsthetics, social organization, sophiology, and somatology. Washington, the center of the Bureau of American Ethnology and the seat of the National Museum, whose work will be mentioned later, forms naturally the center for anthropological work in America; but in New York, with its American Museum of Natural History; in Philadelphia, with the Museum of the University of Pennsylvania; in Chicago, with its Field Columbian Museum, and the University of Chicago, immense and valuable collections of ethnological materials are being gathered and stored for future research and publication. The University of California has recently organized a department of anthropology for field investigations, and has already a number of trained investigators conducting explorations.

Briefly characterized, the institution at New York, in the field of ethnology, is primarily occupied with the collection of data in American linguistics, but it possesses also the most important laboratory of physical anthropology in America, where methods in somatology are being worked out on mathematical calculations, which promise to give to this science a more precise character and influential position than it has hitherto held. Notable collections are to be found there, and one of the most ambitious exploring expeditions in the history of the science is being conducted on the coasts of northwestern America and Siberia, the researches of which are not yet concluded. From the University of Chicago notable work has been done among the Indian tribes of southern Mexico. Splendid collections of physical data, including measurements, photographs, and plaster casts have been secured from large series of individuals and numerous tribes. All the above private institutions, as well as several others, are spending large sums of money cramming their museums and store rooms with the fast disappearing ethnographic materials of America.

The National Museum at Washington is deserving of special mention here because of the magnificent ideas both as to collection and the display of objects that enter its work in the section of ethnology. In its collection of materials the Museum has almost abandoned the indiscriminate gathering of objects—the odds and ends of a community's life, and adopting the family group as the unit of social organization is building up its accumulations on this idea. The aim is to secure everything worn, made, and used by each member of the group, and each collection must show with completeness every detail of the life it represents. In its method of display the National Museum without doubt leads the world. Accurate and life-like figures of the different tribes represented are designed and modeled in staff, and grouped so as to show the hunt, the camp fire, or the ceremonial rite. The result is not only most instructive, but is of surprising artistic beauty.

The national institution may well serve as a model for the Philippine Museum, established by the Philippine Commission and placed temporarily in charge of this bureau.

PROJECTED WORK OF THE BUREAU.

There is still before the members of the bureau a large amount of desk and library work in systematizing the results of previous investigations in these islands. Especially is this true in the field of Philippine languages, many of which have been studied for centuries, and also in researches into the culture of the Filipino tribes as they were at the time of the Spanish conquest.

THE ETHNOLOGICAL AND GEOGRAPHICAL SURVEY.

But by far the most important work to be done, and which will occupy the major portion of the time of the members of the bureau, is in the field, and there is scarcely a mountain or an island in the entire archipelago that does not invite investigation.

The first reconnaissance has just begun, and within a few days the party will proceed eastward from Baguio, Benguet, into the mountainous country lying between the valleys of the Rio Agno and the Rio Magat. The old Spanish comandancia of Kayapa, which has never been occupied by Americans, will be thoroughly explored, and then the party will proceed through the mountains to Bayombong, Nueva Vizcaya. This intervening country is quite unmapped, and a rough topographical survey of it will be made en route. The governor of Benguet will accompany the bureau's party as far as Kayapa. From Bayombong short excursions will be made south and east into the unexplored Carabello Sur, to locate and determine the character of the Ifugaos and Italones, and also northward through the former comandancia of Kiangan to make brief investigations of the Ibulus and Mayoyao.

The special object of touching these tribes at this time is to determine their relationship to the great Igorrote family of the Cordillera Central. The party will then proceed down the Magat into the province of Isabela with the particular purpose of learning something about the Gaddanes and Catalanganes. From there a route will be sought westward into Bontoc. Whether the old trail reaching Bontoc through Lias and Talubin will be taken, or whether the party will proceed farther down the river into Cagayan, and thence return up the valley of the Rio Chico, can not now be stated. Travel at this time of year is difficult and arduous, owing to continuous storms and swollen rivers, and the plans of the party will have to bend somewhat to the exigencies of the situation as they arise. On the north the boundary line between Igorrotes and Tinguianes will be determined, if possible. The special objects of this first reconnaissance are to determine the geographical habitat of the Igorrote and the number of their tribal and linguistic groups; to complete a study of the Igorrote community; to investigate the economic life and the trading relationship that exist between the northern primitive tribes, and so far as possible to determine the character of the wild tribes bordering the Igorrotes on the north and east.

The field party consists of the chief of the bureau, Dr. Albert Ernest Jenks, assistant chief, Mr. Martin, official photographer, an American packer, an interpreter in the Ilokano and Igorrote dialects, and a native cook. The party is well equipped with waterproof tents, riding and pack saddles, instruments for photographical surveys, anthropometric instruments, photographic supplies, etc. Most of this equipment was purchased by the chief of the bureau in the United States, and was made on plans especially designed for use in this work. Its general adaptability for mountain exploration has been proven by its use in the past two months.

Following the completion of this survey of Igorrote tribes, the field party of the bureau will return to Manila for necessary office work, and thence a party will be sent into the Zambales Mountains to make a thorough study of the Negritos of Zambales, Pampanga, and Bataan. The Negritos of this mountain chain offer special inducements to scientific investigation. The physical type is pure and their savage culture almost wholly unaffected. They are relatively numerous, no less than 4,600 being reported from southern Zambales alone. Here, if anywhere in the archipelago, the Negrito can be studied with hopes of making a determination of his physical type, language, social organization, and ideas.

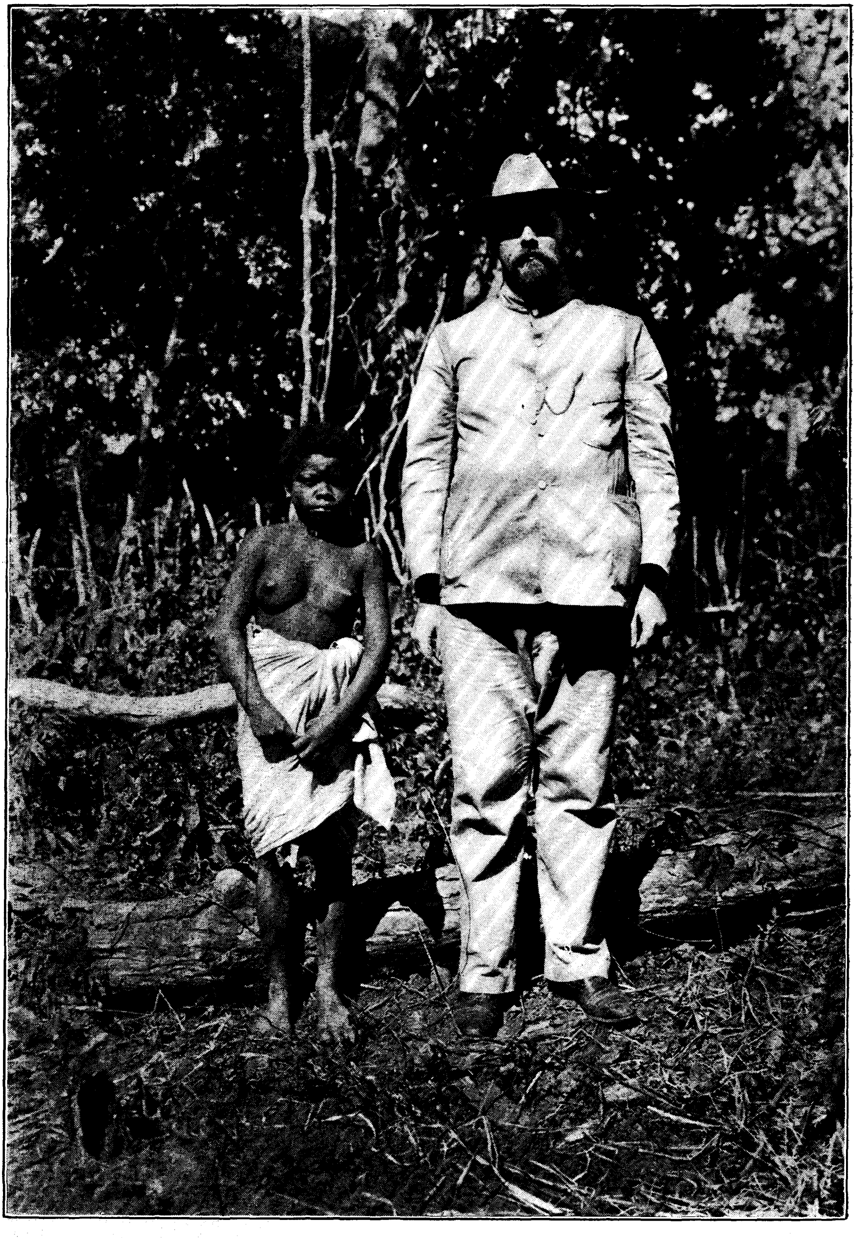
Following this work it is our plan, subject to the approval of the secretary of the interior, to take the entire field force to Mindanao, for continued and more extensive investigations into this most promising of all scientific fields.

REPORT ON THE ORGANIZATION OF CIVIL GOVERNMENT FOR NON-CHRISTIAN TRIBES.

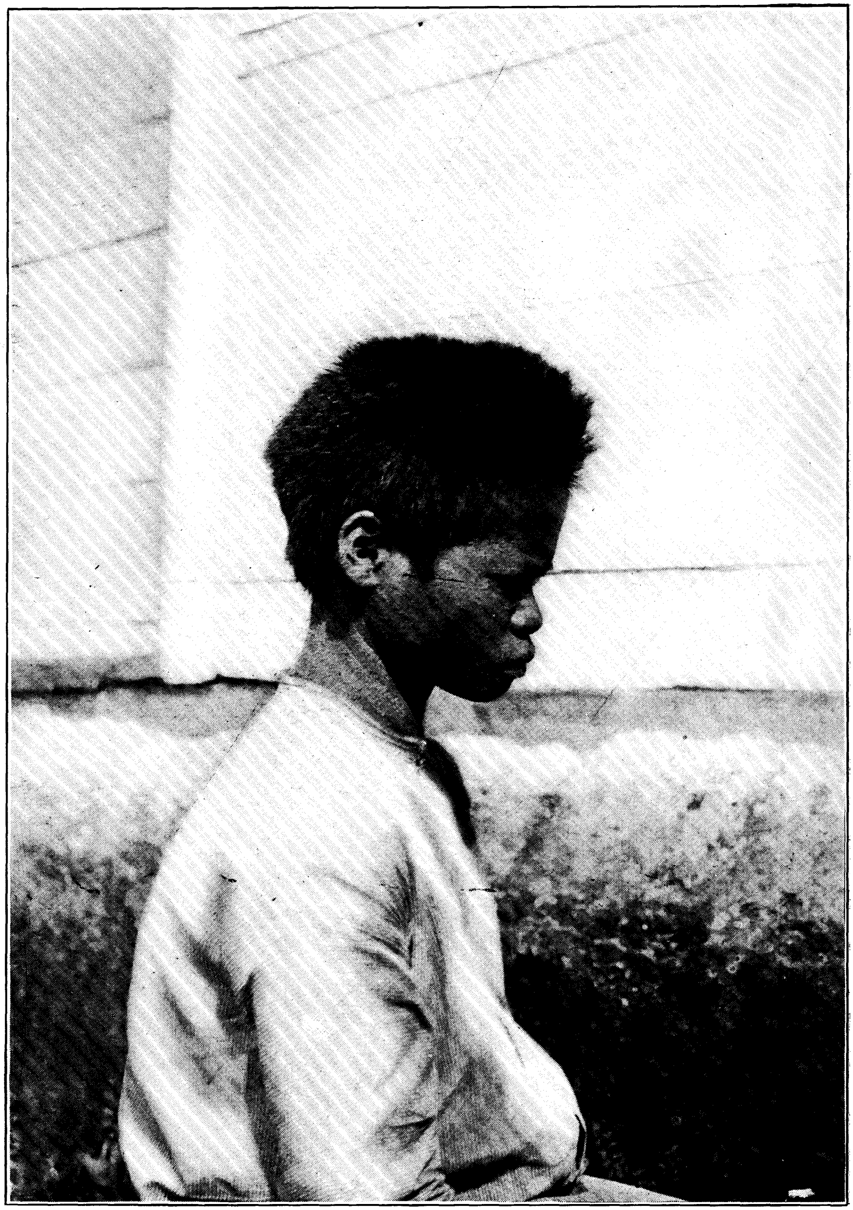
In northern Luzon civil government has now been established by the United States Philippine Commission for the non-Christian provinces of Benguet, Nueva Vizcaya, and Lepanto-Bontoc, which governments are made to include the old comandancias of Amburayan, Tiagan, Kiangan, and Sapao. The undersigned is not prepared, at the present stage of his investigations, to report upon the actual operation and adaptability of these governments. At the completion of our survey of Igorrote territory a full report will be tendered. These governments appear to have been framed largely upon the previous Spanish model, and we believe that they should be regarded as provisional and experimental in character. The ultimate form of governmental control will doubtless vary from place to place, but its underlying principle should everywhere be to foster such democratic tendencies as primitive Malayan society presents, to elevate and make independent the humbler classes, and to protect the under man against the overwhelming influence and authority of the ever present and always unscrupulous cacique.

Very respectfully,

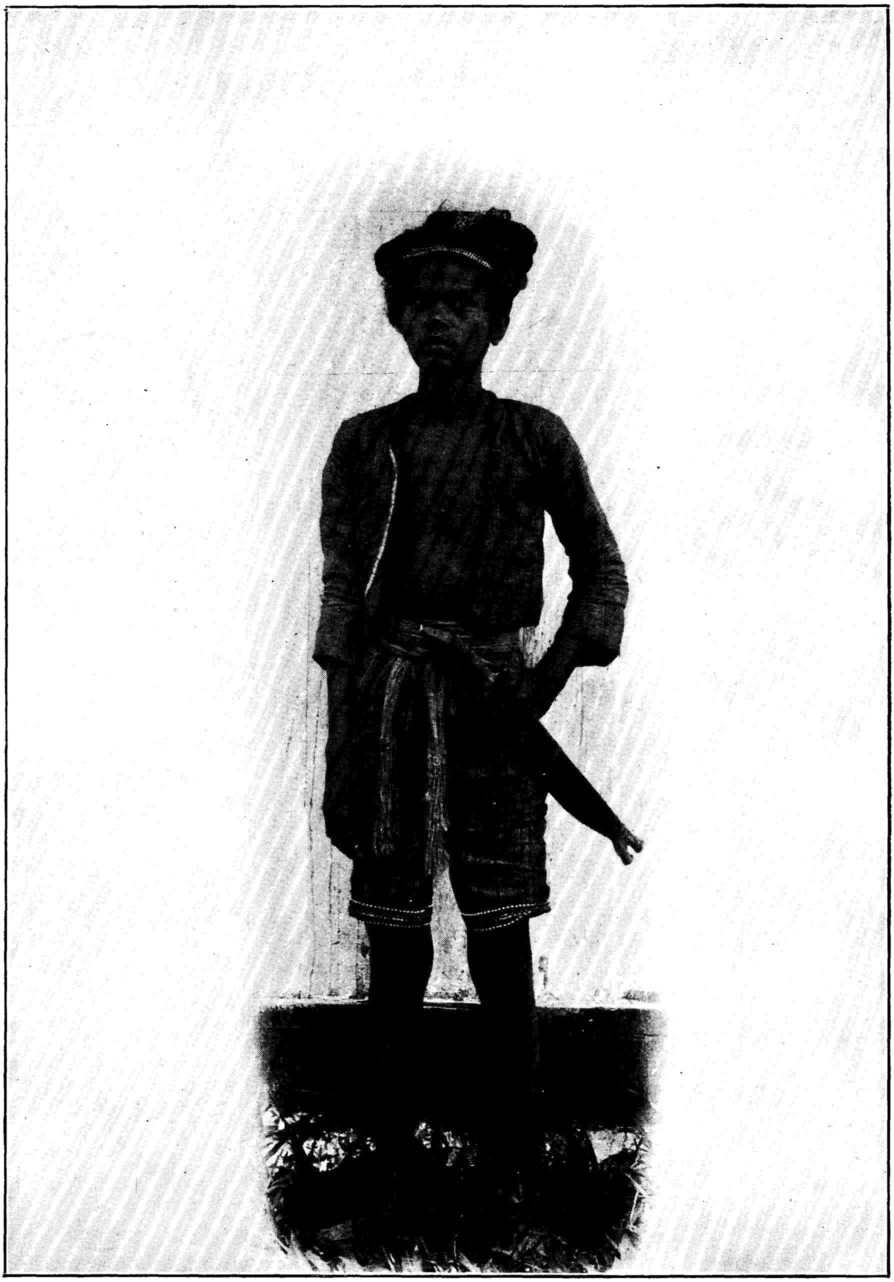
David P. Barrows,
Chief of Bureau.



ADULT NEGRITO WOMAN, SHOWING RELATIVE SIZE.



A "REMONTADO," MOUNTAINS OF RIZAL PROVINCE.



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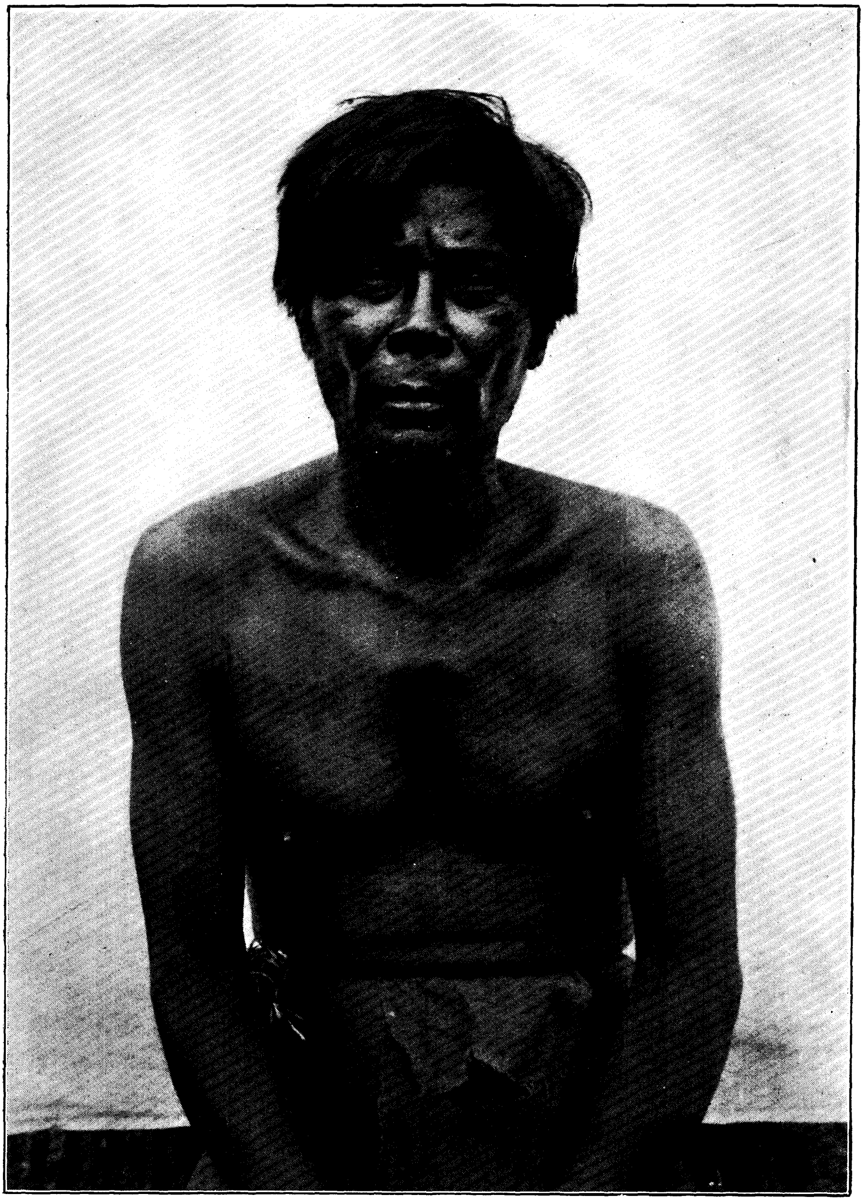

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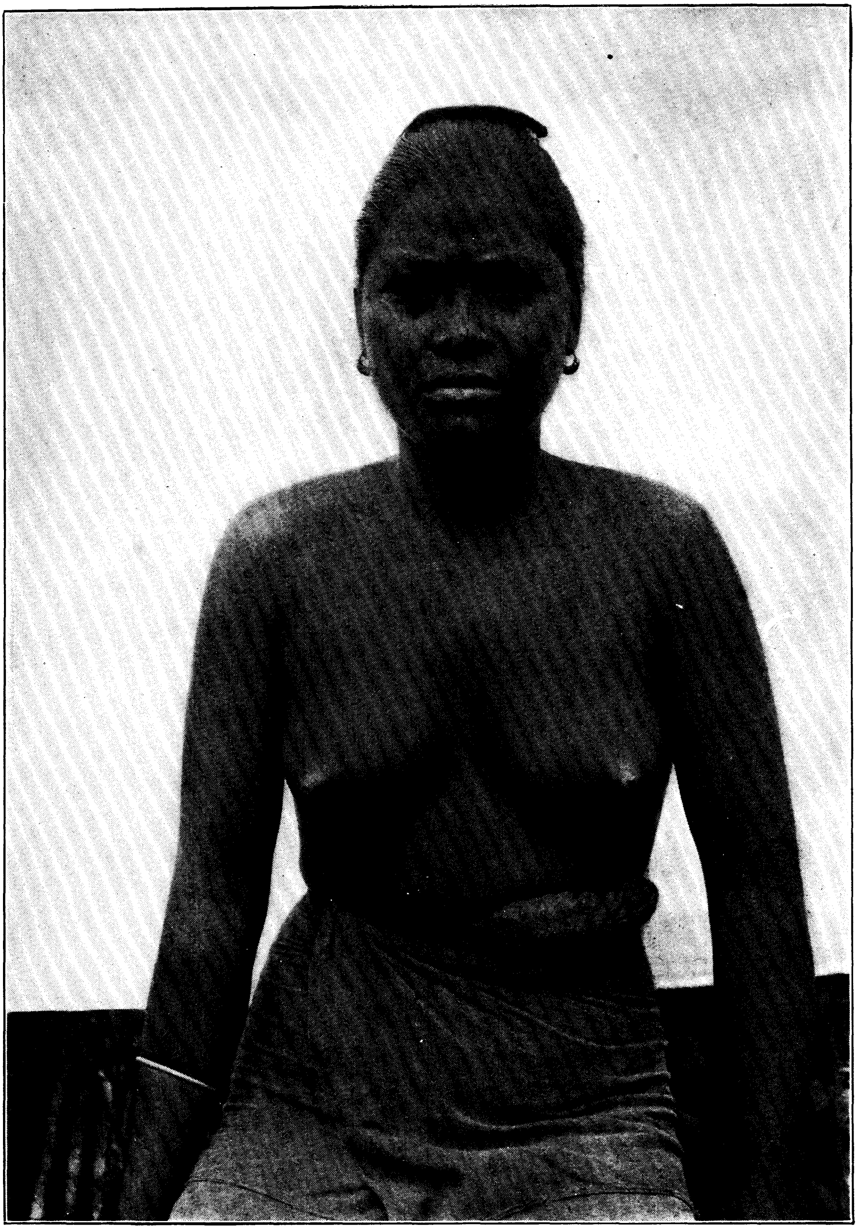

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